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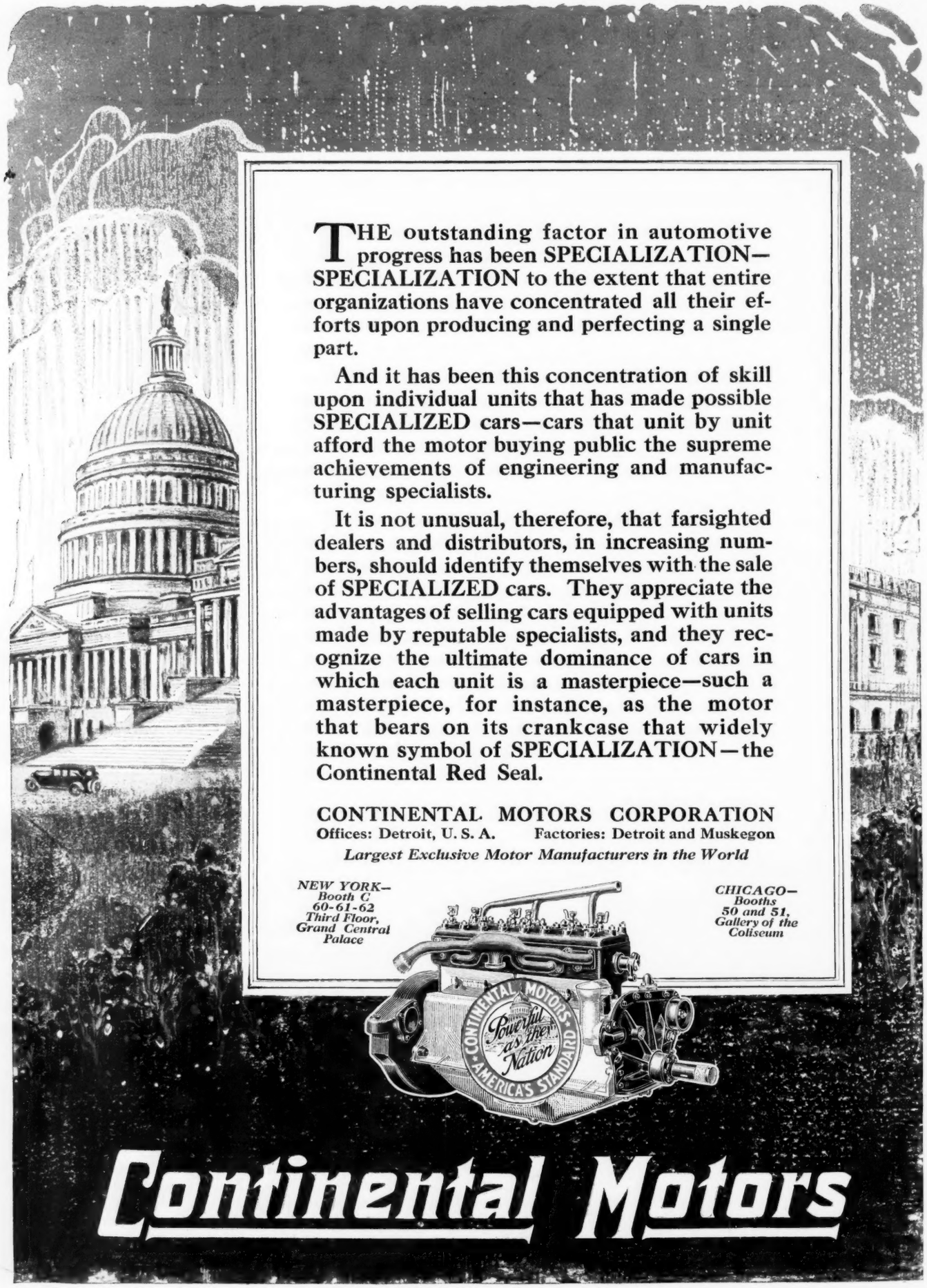

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLV. NEW YORK—THURSDAY, DECEMBER 8, 1921 No. 23

Executives Should Foster Use of Standards

Proper use of standard specifications, fittings and dimensions tends to eliminate waste, save time and cut expenses. Engineers know the value of standards, but executives have, in general, failed to realize their importance and encourage their use.

By Herbert Chase

EXECUTIVES in the automotive industry know in a general way that standardization work has been going on in their industry for many years. They doubtless believe in it as a more or less desirable thing, but there are many evidences that they do not appreciate its value to them as a means of simplifying detail, saving time and waste and cutting the cost of their product.

These are days when economy counts, so it will pay every executive who is interested in minimizing expenses to ask himself the following questions:

1. Do the various departments of my business know about existing standards, and are they following and co-operating in the development of standards where no standards now exist?

2. Are standard specifications for material and parts, standard mounting dimensions and the like, employed to the fullest extent practicable in the engineering, purchasing, production, selling and service departments of my business?

3. Is there, in cases where non-standard material etc. is not being used, good reason for not following standard practice?

4. Am I encouraging my subordinates to study and employ standard practice wherever it is applicable?

5. If standard practice is not being employed, is the fault with my product, or with the standard?

If the first four questions cannot be answered in the affirmative, there is no time like the present to investigate and supply a remedy for the situation.

Executives who are not thoroughly sold in respect to the value of standardization, or consider the matter quite too intangible for serious consideration, are urged to read the following facts, for without some such concrete information the whole matter will remain too indefinite for its inherent benefits to be appreciated.

An analysis of estimates made by about 150 engineers and executives in the automotive industry shows that the saving resulting from the use of standards amounts to about 15 per cent of the retail price of the product. It the total value of automotive products produced in this country annually is taken at five billion dollars, the saving on this basis amounts to $750,000,000, a sum sufficient to warrant consideration even by those who do a business of the proportions mentioned.

Steel manufactured to standard specifications can, in some instances, be had for one-third to one-half the price charged for special steel rolled to a special

gage, such as was often used before steel specifications were standardized, and is still used in some cases.

One manufacturer who supplies rubber goods to other automotive manufacturers states that standardization has enabled him to increase his production threefold with precisely the same equipment as was formerly used to produce one-third its present capacity.

There is almost universal recognition of the fact that standardization within a given plant results in economies which, if not realized, place the manufacturer in an unfavorable position to compete with other plants which realize economies through standardization. Can it be doubted that similar economies would result in plants from which a certain group of manufacturers purchase if these manufacturers would agree on a certain set of uniform specifications, providing a reasonable range for selection, but maintaining uniformity where the deviation is now inconsequential? The manufacturer who is arbitrary in making purchases, even when the quantity is large, is certain, in the long run, to pay more than he would for a standard article. The salesman may attempt to disguise the fact in his zeal to land the order, but if each customer of a given manufacturer demands a special article which involves special tooling and other unnecessary expense, these expenses are inevitably included in the price at which the product as a whole is sold.

A certain spring manufacturer recently stated that he is compelled to stock some 150 sizes and grades of spring steel. He formerly carried nearly double that number of sizes. There is now a standard for the width of spring stock, and the establishment of standards for thickness of leaves is in contemplation. This should result in considerable economies. **In the meantime the car and truck manufacturer is, of course, paying the spring maker the cost of carrying a large stock of steel in a much greater number of sizes than there is any real need for having.**

Makers of electrical apparatus who build lighting generators and starting motors for many car manufacturers state that the generator used for one car is seldom the same as that employed for another make, and the same is largely true regarding starting motors. The standard S. A. E. mountings are a step in the right direction. They are used quite generally for starting motors, but not so generally for generators.

Added Cost of Non-Standardization

Of course, each car manufacturer pays for special tooling and machine set-up in order to get the particular size and shape of generator or motor desired. This is probably a relatively small item in a large order, but it effectively prevents standardization by the electrical manufacturer on a few sizes and types, and the cost is necessarily higher. This fact may not bother one electrical manufacturer at all so long as competitors have to face the same conditions, for the car manufacturer pays the bill. The car builder, in turn, passes on the cost to the purchaser.

Now all this and hundreds of similar circumstances would not be so serious were it not for the fact that service becomes far more expensive than there is need for it to be, and this, again, places an unnecessary burden upon the car owner. The parts manufacturer is expected to establish service stations where stocks of spare parts are presumably maintained for ready replacement. Much money is tied up in these stocks and much detail is involved checking and keeping the stocks complete. Yet this is only one item out of scores which must ultimately receive attention in a complete servicing system. So complexity grows, and with it expense of service increases. Is it any wonder that the user has ground for complaint?

Factors of this kind have received far too little attention on the part of automotive manufacturers. In days when the demand for cars was always less than the supply it was perhaps natural that they should be more or less neglected. Under present and future conditions first cost and maintenance cost are and will continue to be factors having a great bearing upon sales resistance. No sane manufacturer who contemplates remaining in business can afford to overlook them. They must be minimized, and one means to this end is standardization.

No Throttling of Initiative

The foregoing should not be interpreted as a plea for throttling initiative, or for making all cars so nearly alike that they differ only in name or in external appearance. Far from it. It is rather a plea for using individuality where it counts rather than in details which have no bearing whatever upon performance and but little upon external appearance. When designing an engine, why not use a standard size of exhaust pipe and provide for mounting a generator which is now in general use and giving good satisfaction? If a new gearset or axle is in contemplation, why not employ standard sizes of bearings already widely distributed, and standard sizes of splined shafts, for example? If new springs are to be fitted, at least select a standard width of stock and a leaf thickness which is easily obtained. A suitable combination can, no doubt, be used to give the desired riding quality without selecting an odd size of stock. **The manufacturer who fails to do things of this kind is certain to pay the penalty in higher prices or in failure to give satisfactory service when conditions demand it.**

Granting, now, that a case for standardization has been established, what is to be said regarding existing standards and of the means employed for bringing standards into existence?

There are in the automotive field to-day some 300 standards, most of which have been established as a result of painstaking endeavor on the part of the Society of Automotive Engineers. Many of these standards have been extensively used, and some of them have almost universal application. Others are, for various reasons, but little used. For many years the S. A. E. has maintained, largely at its own expense, an office organization which, under the direction of a Standards Committee, has done the great amount of routine and detail work required in the intelligent creation of standards and the dissemination of information regarding them. Hundreds of manufacturers in the industry have co-operated in this work, but on the whole there appears to be but slight appreciation of its great value. In any case the work has been carried forward more through the initiative of the society than as a result of a spontaneous demand on the part of the industry.

As compared to the manufacturer, the designing engineer has but little to gain from standardization. It saves him time and annoyance over details which would otherwise require his attention, and thus leaves him freer to concentrate on other problems; but it is the manufacturing and purchasing departments which profit most. Strange to relate, but little pressure for standards has come from this quarter.

Aside from their convenience there is but little incentive for the engineer to employ standard practices. The economy they effect is not always apparent on the surface, and he is too seldom given credit for such economies. The manufacturer should furnish the necessary

incentive. He should, in fact, encourage the use of standards from the very inception of the design.

Standards should not be regarded as fixed practice which cannot be changed as conditions change, for such is not the case, so far, at least, as the term applies to standards adopted by the S. A. E. Standards require change from time to time, and there is adequate machinery for this purpose which is easily set in motion when there is a demand for it. Hence the fact that some existing standards may be open to just criticism is no excuse for general criticism of standardization work. If any group of manufacturers find existing standards unsatisfactory, they can easily initiate a reconsideration of the standard with a view to bringing it up to date or in closer harmony with existing conditions.

In one or two instances certain groups of manufacturers have taken a dog-in-the-manger attitude regarding standardization—they have insisted that they were the only group which should presume to set standards, and yet have then failed to establish standards that are admittedly needed.

The creation of standards requires much painstaking work and must not be lightly considered. It matters but little who does the work so long as it is well and thoroughly done, but since the S. A. E. has had long and creditable experience in this direction, is impartial and has a well-trained organization in the field, there would seem to be every reason to encourage and support the work it is doing. The strange fact is that encouragement to date has been more or less passive or sporadic rather than active and continuous.

THE unanimous verdict of those who have investigated the facts is to the effect that standardization pays. The executive who is not encouraging the use of standards in his own plant is overlooking possible economies which existing conditions demand. Ten minutes spent in reading this article should convince him of the facts. Standardization is not an abstract thing of doubtful value. It is a modern economic necessity yielding many concrete advantages. Put it to work on your behalf.

Probably no single thing would be more helpful to automotive manufacturers in their efforts to minimize production and service expense than to appoint a committee which would make it its business to see that the standardization work of the S. A. E. is encouraged by all possible means and, if possible, carried forward on a much more extensive and intensive scale than ever before.

Standardization is an important factor in foreign trade, perhaps even more than in domestic. Germany has recently awakened to this fact and is planning to apply it fully in her efforts to regain the foreign commerce she lost during the war. Her plans, in fact, indicate that she means to carry standardization much further than it has been carried heretofore. The British also are awakening to the possibilities of the situation and have much commendation for the great progress which standardization has made in this country and the important influence which it has had on the rapid growth of the automotive industry here. Having achieved so much it is important that we maintain the advanced position which we now hold. It is no time to let the grass grow under our feet.

Several divisions of the S. A. E. Standards Committee will present reports at the annual meeting of the society to be held in New York during automobile show week. Engineers and other representatives of manufacturers are welcomed at the Standards Committee meeting on Jan. 10, whether they are members of the society or not. A summary of the reports to be presented at this meeting is given on the following pages, and the full reports are printed in the December number of the journal of the society. Manufacturers should manifest interest in the work by having their engineering and production departments scrutinize the reports and discuss them.

REVIEW OF STANDARDS REPORTS

Tachometer Drive (Aeronautic).—Experience having shown that the driving element of the present recommended practice is not strong enough to prevent binding in the tubing, due to the tendency of the flexible shaft to untwist, it is recommended to change the diameter of the driving shaft from 0.152 to 0.187 in., and the drill size for the hole for the shaft from No. 20 to No. 11, the tolerances remaining the same.

Annular Ball Bearing Tolerances.—Upon complaint of a user that the tolerances on the bores of inner races were too great to permit accurate fits in all cases, a subcommittee investigated the practice of the ball bearing industry and found that the actual dimensions of these bores are usually between nominal and two-thirds the minus limit, and very seldom on the plus side of the nominal dimension. It is felt that the tolerances now specified in the S. A. E. standards can be reduced without hardship on the ball bearing industry, and it is suggested to eliminate the plus tolerances entirely and make the minus tolerances 0.0004 in. for 4-25-mm. bores, 0.0005 in. for 30-55-mm. bores, 0.0006 in. for 60-80-mm. bores, 0.0007 in. for 85-110-mm. bores and 0.0008 in. for 120-210-mm. bores.

Roller Chain Sprocket Cutters.—A table of dimensions of these cutters is presented, giving the pitch, cutter bore, outside diameter and keyway dimensions for cutters for sprockets of different pitch and roller diameters. The following extension to the present S. A. E. standard for such cutters is recommended:

"Two straddle cutters shall be used, an *A* cutter having an average pressure angle of 23 deg., for use where the arc of contact between the chain and the sprocket is fairly large, and a *B* cutter having an average pressure angle of 17½ deg., for use only where the arc of contact is small.

"All cutters shall be marked with the pitch, roller diameter and the range of the number of teeth for which each cutter is designed."

Roller Chain Breaking Strengths.—It is recommended that the minimum breaking strengths as given by the following formula be specified:

$$\text{Min. Breaking Strength in Pounds} = 105{,}000\ (\text{Pin Dia.})^2 - 700.$$

It is also recommended that the thickness of center plates for double, triple and quadruple chains shall be equal to twice the thickness of the inside plates in standard single roller chains.

Insulated Cable.—It is recommended to substitute carbon tetra chloride for caustic alkali solution as a cleansing medium for the copper wires of insulated cables, as the latter leaves the wire in a condition where it is likely to be attacked by the sulphur in the rubber insulation, and is, therefore, not used. It is further recommended that the strength of the sodium poly-sulphide solution be definitely specified as of a "specific gravity 1.142 at 70 deg. Fahr.

Generator Flange Mounting.—A slight change in the dimensions of the length of the shaft end from the hub to the center of the cotter pin hole, and of the overall length of the shaft end is recommended, the object being to make the length of the threaded portion of the shaft end practically the same for both No. 1 and No. 2 flanges and permit using the same shaft end in either size of generator.

Starting Motor Flange Mountings.—It is recommended that the drill holes for the holding bolts be made 7/16 in. instead of 13/32 in., which will permit the use of a more common drill size, increase the clearance for the bolts and facilitate assembling on the engine.

Flexible Steel Conduit.—The present specifications are to be revised to conform to the revised standards for insulated cable adopted last July. The table of dimensions, which now covers sizes from 3/16 to 1 in. inside diameter, is extended to cover sizes up to 1¼ in. The table also includes additional columns covering limiting inside diameters, approximate net weight per 100 ft., minimum tension and minimum radius for bending test. In addition to the galvanizing test in the present specifications the new specifications give tests for insuring mechanical quality, directions for installation and general information.

Non-Metallic Conduit.—A new recommended practice covering the use of this material for automobile wiring is suggested. The table of dimensions is uniform with that for flexible metallic conduit. General information and rules for installation are given, as well as specifications for insuring quality.

Carbureter Flanges.—It is recommended that the flange size for ½-in. carbureters shall be the same as that now specified for ⅝-in. carbureters, and that for ¾-in. the same as now specified for ⅞-in., the object being to reduce the number of flange sizes by two.

Engine Numbers.—In order to make it difficult for thieves to obliterate or change engine numbers the following system of numbering engines is suggested:

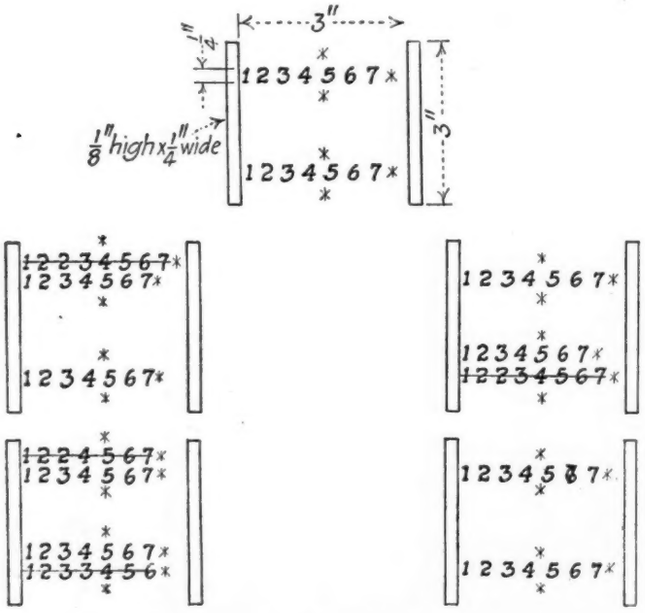


FIG. 1—METHODS OF NUMBERING ENGINES

The arrangement in the single view at the top is correct and the numbering in the upper pair of drawings is acceptable, only one number having been corrected in each case. The lower pair of drawings show two cases that are not permissible; in the drawing at the left both numbers have been corrected or changed, while in the other drawing a single digit has been corrected by stamping a second digit over the original one

"The engine serial or identification number shall be placed near the top of the right-hand side of the crankcase proper in a position in which it can be read easily. It shall be between two vertical ribs or beads ¼ in. wide, ⅛ in. high, 3 in. long and 3 in. apart, as shown in the single drawing at the top of Fig. 1. The surface of the casting between the ribs shall be left rough as cast and unpainted on the finished engine. The numbers shall be evenly stamped in the casting 1/32 in. deep and shall be ¼ in. high and of script form. The first digit shall be stamped close to the left-hand rib and the last digit shall be followed by a large star or other character to prevent adding digits. A star or other character also shall be stamped immediately above and below each number to prevent adding another number. The numbers shall be stamped twice on each casting, as illustrated, to permit correcting any errors made in stamping either number. No other number or character shall be placed within the space provided.

"If an error is made in stamping one number it may be crossed out and the correct number stamped in immediately above or below, as shown in the upper pair of drawings in Fig. 1. In no case shall both numbers be crossed out, as shown in the lower left corner, and new ones stamped, and more than three numbers must never appear, one wrong number crossed out and two correct numbers."

Reduction in Theft Insurance Premiums

Assurances are said to have been received from the underwriters that a reduction of 7½ per cent in theft insurance premium will be granted if the engine numbering is in accordance with underwriters' requirements, and 20 per cent if both the engine and frame are numbered in accordance with these requirements, which are to be based on the work of the committee.

Fan Belts and Pulleys.—Heretofore only flat belt drives for fans have been standardized, but the Engine Division now presents an extension of the recommended practice covering both flat belt and Vee belt drives, fan pulley spindles for both solid and slotted brackets and pulleys for flat and V belts. The distance between the rear face of the collar on the spindle and the center of the pulley and that between the center of the pulley and the rear face of the radiator are to be standardized.

Engine Testing Forms.—Some minor additions to the data to be entered on these forms are suggested, and it is also to be proposed that results be corrected to a temperature of 60 deg. Fahr. and 29.92 in. mercury by using the formula:

$$\text{B. Hp}_c = (\text{B. Hp}_o \times P_s) \div (P_o \sqrt{T_o/T_s}),$$

where

B. Hp$_c$ = corrected brakehorsepower
B. Hp$_o$ = observed brakehorsepower
P_s = standard barometric pressure in inches of mercury
T_o = observed absolute temperature in degrees fahrenheit
T_s = standard absolute temperature in degrees fahrenheit

Mufflers.—Nine sizes of cylindrical mufflers are recommended for standardization, and diameters of exhaust pipe and tail pipe are given for each. The length of the exhaust pipe from the manifold to the muffler is to be not less than 5 ft. Muffler mountings are to be standardized later if it seems desirable.

Running Board Brackets.—A design of pressed steel running board bracket for passenger cars is presented. The length of the horizontal portion of the bracket is left open and three heights, from the top of the horizontal portion to the center of the two lower rivet holes, are provided for; namely, 4, 6 and 8 in.

Iron and Steel Specifications.—A very lengthy report

has been prepared by the Iron and Steel Division which revises all of the work ever done by this division and brings it up to date. The standards for which this division is responsible are also better systematized. Charts of physical properties are issued for the first time for the 3200, 3300 and 3400 series of steels (nickel-chromium). Emphasis is laid on the fact that the values given in these charts are conservative for sections from ½ to 1½ in. in diameter or thickness, and it is stated that similar charts for sections above the upper of these sizes will be prepared later.

Eight Types of Heat Treatment

All heat treatments are reduced to eight types, and in order to obviate confusion with the older heat treatments, which were designated by capital letters and are specified in this way on many blueprints, the new heat treatments are designated by Roman numerals. The temperatures for use in connection with these heat treatments are not fixed generally, but are given in connection with the composition of the steel to which the heat treatment is to be applied. As the same type of heat treatment is used for a number of different steels, this plan makes it possible to specify temperature limits more suitable for the particular steel to which the treatment is to be applied.

The S. A. E. system of code numbers for identifying grades and types of steel is continued. The first figure indicates the class to which the steel belongs: thus "1—" indicates a carbon steel; "2—" a nickel steel, and "3—" a nickel-chromium steel. In the case of the alloy steels, the second figure generally indicates the approximate percentage of the predominant alloying element. Usually the last two or three figures indicate the average carbon content in "points" or hundredths of 1 per cent. Thus 2340 indicates a nickel steel of approximately 3 per cent nickel, 3.25 to 3.75 and 0.40 per cent carbon, 0.35 to 0.45; and 71360 indicates a tungsten steel of about 13 per cent tungsten, 12 to 15, and 0.60 per cent carbon, 0.50 to 0.70. The basic numerals for the various qualities of steels specified are:

Carbon steels	1
Nickel steels	2
Nickel-chromium steels	3
Molybdenum steels	4*
Chromium steels	5
Chromium-vanadium steels	6
Tungsten steels	7
Silico-manganese steels	9

The complete data regarding each grade of steel, such as the code number, the composition, certain notes descriptive of the steel and the heat treatments that will apply for such composition and charts showing the physical properties that may be developed by the recommended heat treatments will probably appear on the same page or on opposing pages of the final report and of the data sheets.

Part I of the report, which follows an introduction, deals in a general way with the numbering system and the specifications and notes on heat treatments and physical properties. Part II covers specifications for automotive steels, including manufacture, chemical properties, finish, inspection and rejection. In Part III are given the chemical compositions of all of the S. A. E. steels. Part IV deals with steel castings and Part V with malleable iron. Part VI gives definitions of metallurgical terms (for general information only). Part VII covers test specimens and is a revision of the present standard, and Part VIII deals with general heat treatments.

The physical property charts, of which 25 are given, are now arranged somewhat differently than formerly, and in connection with them the following explanations are given:

"The charts have been made as valuable as possible to the engineer by indicating what can be expected as the average product of a given composition when treated in the specific manner in 1½ in. sections. Generally on sizes larger than 1½ in. lower values will prevail, and on sizes smaller than 1½ in. higher values will prevail. At the same time the data for the charts have been chosen so as to protect makers of heat-treated stock and parts from unreasonable demands.

"For the sake of simplicity it has seemed advisable to use only average minimum figures for tensile strength, yield point, reduction of area and elongation, based on the following considerations, heat treatment being constant:

(1) The lowest yield-points and tensile-strengths are produced with steels at the bottom of a given range in carbon.
(2) The lowest reductions in area and elongations are produced with steels at the top of a given range in carbon.

"Thus, for Steel 1035, the average minimum yield points and tensile strengths are given as of a steel containing 0.30 per cent carbon; average minimum reductions of area and elongations as of a steel containing 0.40 per cent carbon.

"The figures for hardness are conventional averages for the whole range of compositions within any given specification.

Charts on Steel Tests

"The charts include treatments and conservative physical tests on all S. A. E. steels for which such charts have been prepared. For these charts the following applies:

(1) They indicate the physical properties which may be expected of a standard 0.505 x 2-in. test-specimen machined from rolled bars of 1½-in. diameter or square.
(2) Heat-treatments given in the charts apply to rolled bars that were normalized or otherwise treated prior to heating and quenching as shown on individual charts.
(3) Test-bars 0.505 in. in diameter and 2 in. long, machined from rolled bars after final treatment and tested under normal commercial conditions.
(4) Brinell and scleroscope readings were taken at a distance from the center equal to half the radius and are not to be compared with surface readings on heat-treated bars or parts.

Water Pipe Flanges.—Dimensions for water pipe flanges are recommended, a drawing and table being given similar to the standard on carbureter flanges. This is to supersede the present recommended practice that standard two- and four-bolt types of carbureter flanges be used for motor boat water pipe flanges. The type of flange now recommended is believed to be satisfactory for general automotive use.

Lock Washers.—A new table of standard dimensions for lock washers is presented which differs from the old table mainly in making the washers somewhat lighter. The old table was adopted in 1911 and the revision conforms to advances in lock washer practice since that date. The new table is largely the outcome of a request made by the Motorcycle Division for the formu-

*This numeral has been agreed upon as the index to the Molybdenum group but no specific compositions have as yet been recommended by the Iron and Steel Division.

lation of a series of extra light lock washers for use on motorcycles.

Passenger Car Door Handles.—In order to permit interchangeability of handles and locks it is recommended that the square portion of the externally threaded type be made 5/16 in., with a ¼-in. 28 S. A. E. thread ⅜ in. long, with a 45-deg., 1/32-in. chamfer at the outer end; and the internally threaded type with a 5/16-in. square portion, drilled with a No. 21 drill ¾ in. deep and counter drilled with a 13/64-in. drill ⅛ in. deep; the drill hole to be tapped with a No. 10 32-in. thread of a usable length of ⅝ in., the pitch diameter limits being 0.1713 and 0.1718 in.

Passenger Car Doors.—The following clearances are recommended for all types of body and are to be measured from wood to wood or metal to metal before painting. Door flange widths are to be 5/16 in. on the hinge pillar side and ½ in. minimum on the lock pillar side and on the bottom:

PROPOSED DOOR-FIT CLEARANCES

Location	Clearance, in.
Hinge side	1/8, ± 1/32
Lock side	3/16, + 1/16, — 0
Bottom	1/4, + 1/16, — 0
Top	1/8, ± 1/32
Jamb	3/16, + 1/16, — 0
Bead	3/32, + 1/32, — 0

Rubber Bushings.—The Passenger Car Body Division recommends the following for adoption as recommended practice: Where holes are punched in sheet metal for carrying grommets or bushings, particularly when these are made of rubber, it is recommended that the holes be necked.

The reason for this recommendation is that when bushings for electric wiring or conduit are inserted in plain holes punched in sheet metal they are quickly cut by the sharp edges, and it is relatively simple and effective to form a neck to the hole when punching.

Wiring for Beads.—To economize in the number of sizes of wire used in the manufacture of parts of beaded construction, such as fenders and splash guards, it is suggested that for engine hoods up to and including 36 in. long, top hinge rods shall be 5/16-in. diameter, and side hinge rods shall be ¼-in. diameter. For fenders, aprons and splash guards the wire used for beading shall be No. 11 B.w.g. bright basic steel wire.

Pressure Gage Connections.—Three diameters of tubing are provided for, ½ in., 5/16 in. and ⅜ in., the first two being used on passenger cars and the last on trucks. The size of aperture recommended is the same for all three sizes of connection, as the area of this opening need not vary for different tubing sizes. As the aperture is frequently drilled in a plug that is screwed into the connection, and as plugs fitting a hole tapped with No. 10-32 thread are usually used, the specification of this thread is included in the recommendation. A ⅛-in. pipe thread connection also is sometimes used, and is recommended as an alternative construction.

Pneumatic Tires and Rims.—It is proposed to revise the present list of standard sizes of pneumatic tires and rims by eliminating the 32 x 3½, 33 x 4, and 33 x 4½-in. rim sizes and the corresponding regular and oversize tire sizes, and by adding the 30 x 3½-in., straight-side rim and the 31 x 4-in. oversize, straight-side tire.

No Immediate Discontinuation

Particular emphasis is laid on the fact that this recommendation is not intended to call for immediate discontinuation of all other tire or rim sizes. Non-standard sizes will of necessity continue in production on a decreasing scale until those automotive vehicles now in service which are equipped with non-standard rims and tires are finally discarded.

A review of the standardization of pneumatic tires shows that the original list of sizes which was first adopted by the Association of Licensed Automobile Manufacturers nearly 15 years ago has been changed at very frequent intervals, additions generally being made until during the latter part of the recent war a definite schedule for eliminating certain sizes by groups at stated intervals of time was approved. The standard, however, instead of becoming more effective, was more or less disregarded by many car and tire manufacturers for use on new equipment. This condition was one of the influences that led to a lack of co-operative effort and the differences of opinion among the groups interested.

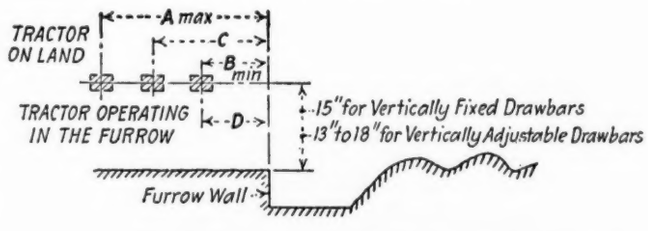
The Cleveland Conference

As the result of this situation a conference was held in Cleveland in November, 1920, which was attended by tire, rim and automobile manufacturers and at which a resolution was passed that the society should appoint a special committee representing the National Automobile Chamber of Commerce, the Rubber Association of America and the Society of Automotive Engineers for the purpose of carefully studying the existing conditions and preparing a recommendation which would meet with the approval of the industry and the national organizations representing its various branches.

The committee thus appointed conferred with the automobile and tire manufacturers and carefully analyzed the situation. The division recommends that the proposed list be used by passenger car and motor truck designers to select tire sizes for apparatus not yet in production, or at such a time as a change to a recommended size can be conveniently made.

It is also recommended that for figuring speedometer gear ratios and fender and wheel housing clearances the actual tire widths and outside diameters be measured on the tires to be used.

Tractor Drawbar Height.—The following extension to the present recommended practice is proposed:



PROPOSED TRACTOR DRAWBAR HEIGHTS

Plow	Two-Bottom 12-in.	Two-Bottom 14-in.	Three-Bottom 12-in.	Three-Bottom 14-in.	Four-Bottom 12-in.	Four-Bottom 14-in.
A	30	30	32	32	40	40
B	15	15	20	20	24	24
C	17	20	23	26	28	32
D	15	15	20	20	24	24

A—Maximum position for good operation, ordinarily the best possible position.

B—Minimum position for good operation with the tractor operating on the land.

C—Proper or best average position when the tractor operates on the land.

D—Minimum hitch position when the tractor operates in the furrow.

Transmission Tire Pump Mounting.—It is suggested to cut back the inside edges of the large mounting pad so as to allow more clearance for the idler pinion car-

rier. The two long sides are to be cut away 3/16 in. between bolt holes.

Clutch Facings.—In order to reduce the number of sizes of clutch facings used and thus gain the advantages of the resulting economy, two tables of dimensions are presented, one for multiple disk and the other for single disk clutch facings. The tables specify thickness, inside and outside diameters, with tolerances on all dimensions. It is also planned to standardize rivets and their location, but this will require further study. The clutch facing sizes are intended for use on new designs only.

Three-Joint Propeller Shafts.—Diagrams and tables are given for three types of shaft end, viz., square, tapered and splined.

Bases, Sockets and Connectors.—Limits of 0.306 in. and 0.312 in. are added to the distance from the end of the plunger sleeve to the top of the locking slot, the limit of 0 to 1/64 in. for the distance from the top of the plunger when extended to the bottom of the locking slot is eliminated and a footnote referring to the locking pins and slots of the bases, sockets and plugs is to be added, to the effect that the variation from the center line shall not be more than 0.003 in.

Lamp Glasses.—It is recommended that in the standard for lamp glasses the dimensions for four locking notches be specified, which are required to prevent the turning of other than plain glass lenses in their mountings. These notches are to be 17/32 in. wide and 3/32 in. deep.

Tail Lamps.—Tail lamp mounting dimensions are recommended. Two ¼-in.-20 mounting studs are to project from the rear of the lamp housing a distance of ⅝ in., these studs being on the horizontal axis 1 in. from the vertical axis each. The tail lamp glass diameter is to be 3 in. plus 0, minus 1/32 in. The projection of the socket from the lamp shell is to be 1¾ in.

Non-Ferrous Metal Specifications.—The same as the Iron and Steel Division, the Non-Ferrous Alloys Division has revised the specifications for which it is responsible and has added to them particularly specifications of solders. As far as possible the new specifications have been drawn up to accord with the specifications of the American Society for Testing Materials. Specifications Nos. 1, 2, 3 and 4 cover solders; No. 14 covers babbitt; No. 43, manganese bronze; No. 44, cast brass to be brazed; No. 45, brazing solder; No. 70, commercial brass sheet; No. 71, copper sheet; No. 73, naval brass (Tobin bronze) rod; No. 76, naval brass (Tobin bronze) tubing; No. 80, brass spring wire; No. 81, phosphor bronze spring wire; No. 88, brass forging rod.

Rod Ends.—The following is to be incorporated in the standard on this subject:

(1) Specify dimension *K* as the diameter of the pin-bosses on the drawings for the adjustable and plain yoke-rod-ends, the same as now specified for the pin-boss of the eyerod-end.
(2) Change dimension *K* in the table for the ⅞-in. size from 1-13/16 to 1-11/16 in.

Taper Fitting for Plain or Slotted Nut.—A footnote is to be added to the effect that the center line of the cotter pin hole shall be 90 deg. from the position of the keyway, as shown on the drawing. This recommendation is made merely with the object of insuring uniform practice.

Body Nomenclature.—The Passenger Car Body Division submits a list of names for different body types. In selecting the names the committee bore in mind the derivations of the several terms, their application to their now more or less obsolete horse-drawn prototypes and the accepted European or international usage. The most radical change as compared with present usage is the proposal to use the term phaeton for what is now generally known as touring car. The principal reason for suggesting the change is that the term touring body has lost its significance as applying to any particular type of body, as all types are used for touring. The term "phaeton" is used extensively in Europe and to a considerable extent in America in connection with passenger cars; it is the name of a horse-drawn prototype; touring body is inelegant and in a technical sense is not distinctive of any particular type of motor vehicle body. The committee distinguishes 15 types of body and gives illustrations of all, but as yet has not decided on a name for two of them.

Tractors for South Africa

A REPORT recently received by the National Bank of South Africa, Ltd., from the British Trade Commissioner at Capetown on conditions affecting the working of motor tractors in that territory gives some interesting data on the type of machines required for agricultural purposes there. The loss of power in internal combustion engines, due to the high altitudes met with in South Africa, is to some extent modified by the lower average temperature at higher altitudes; but nevertheless, the difference is considerable, approximately 10 per cent. at 4000 ft., and well worth consideration from the designer's point of view. Engines should be sturdily built, and able to give their full-rated power at less than 1000 r.p.m. It would be better if their general rate were nearer 600. The reduced speed of an engine working under these conditions leads to a very great increase in the working life of the engine, and makes it altogether a smoother running engine. The South African soil after a drought becomes very hard, and even in what is considered easy soil, hard patches are met with. Very little easily-broken soil is found in the country. Under certain conditions clouds of dust are raised in the operation of ploughing, and this is of a particularly fine penetrating type. The effect of dust on the engine can be readily imagined. The farmers of South Africa in considering the merits of plows usually insist on land being plowed in its hardest condition, for the reason that it would have to be plowed by oxen under similar conditions, and if a tractor will not do it the tractor is of no use to them. The South African farmer does not usually employ a skilled mechanic ready to tune the engine to suit the varying temperatures. A machine that requires nursing is not desirable. The machine which is required is one that is capable of being overdriven and overworked in order to get the work done, and as soon as the machine has proved its worth the cheapest kind of labor will be employed to be put in charge of the tractor. Furthermore, a cheap lubricating oil is likely to be used regardless of the possible effect on the tractor. The tractor to be sold in South Africa must be capable of doing well under the worst conditions.

Design Variations Feature British Light Cars

Widest possible divergencies occur throughout the range, which runs from 60 cu. in. twin-cylinder air-cooled two-seaters to overhead valve fours of 140 cu. in. capacity selling at $3,600. This article contains descriptions of several of these light cars that have come so much to the fore.

By M. W. Bourdon

THE light car movement, owing to the entry of several of Britain's most important motor manufacturers into this line of production, has assumed more importance than ever. Daimler, through its associated concern, the B. S. A. Co.; Armstrong-Siddeley, Humber, Wolseley, Standard, Rover, Calthorpe, Singer, Austin, Vulcan, Belsize, Star, Sunbeam and a score of other firms of more or less renown are now producing, or exhibited at Olympia, two-seaters and four-seaters which belong to this class.

The lowest priced of the light cars produced by the firms mentioned is the two-seated, 8-hp., horizontal, air-cooled, twin-cylinder Rover, which has dropped in price from £300 to £220 during the year. The most expensive is the Sunbeam, which has a four-cylinder engine of approximately 118 cu. in. and sells at £725 with four-passenger body.

In between the above is almost every imaginable variation in price, cylinder number, cylinder arrangement and cooling. Some are sold with a regular two-seated body, others with a two-seater with double dickey; the remainder (with one exception) have optional bodywork, i. e. two-seater with double dickey or four-seater. The exception is the Armstrong-Siddeley production, known as the Stoneleigh utility car, which has a three-seated body of reversed clover-leaf pattern; driver's seat, steering and controls are central, with the rear two-passenger seat removable to provide space for up to 250 lb. baggage.

The most notable development during the past twelve months has been encouraged by the success of the 8-hp. Rover (described in AUTOMOTIVE INDUSTRIES of Sept. 1 last). It has sold quite freely and deliveries at several periods during the year were a month or so behind orders, despite an output of 120 per week, which is the largest of any one British model. The little Rover, when it was first put forward, was the cause of considerable ridicule directed at its makers; having done well with their 12-hp. model (still continued) they were held to be adopting a policy that would lower their prestige. But the Rover company has shown foresight rarely exhibited; it has almost created a demand, and the popularity of the 8-hp. two-seater has, without question, been entirely responsible for the introduction of the B. S. A., 7-hp. Wolseley and Stoneleigh. However, only the Stoneleigh—which is not yet in production—offers attractions comparable to those of the Rover, and the latter at the moment appears to be threatened but very slightly. Primarily, it scores over its would-be competitors in price (except the Stoneleigh at £225), for the B. S. A. and Wolseley are offered at £340 and £310 respectively, though admittedly both of the latter are worth more than and possibly almost as good value as the Rover. But their price takes them out of the range of the Rover appeal, for the man who has £300 or so to put down can get and usually prefers a four-cylinder light car.

The light car movement, as distinct from the early cycle car boom, started with a four-cylinder engine of under 67 cu. in., and a number of firms, such as Singer, Calthorpe and Swift, are still concentrating mainly on this. Standard originally was in this field, and then got out of it with an engine of approximately 100 cu. in., though still continuing to offer both the two-seaters and four-seaters of 11 hp. as "light cars." Calthorpe was first to offer one of the smaller four-cylinder types with a four-passenger body, after having increased engine capacity to 76 cu. in.; this four-seater, however, is more of a "sporting" type, with passenger accommodation hardly likely to be appreciated by elderly aunts and similarly staid individuals. But Standard has now gone back to the original size of engine, though retaining the larger model after increasing its engine and chassis dimensions for 1922. The new model is designated an 8-hp., though its engine dimensions are identical with those of the pre-war two-seater rated at 10 hp., the displacement being 66 cu. in.; and yet it is offered with a comparatively comfortable four-passenger body as an option to a two-seater with double dickey. Wolseley retains the 10-hp., four-cylinder model (76 cu. in.) and also offers bodies for two or four adults.

Next in point of engine size comes the biggest variety of all, the type so prominent at the 1920 show, and having an engine displacement of approximately 90 to 100 cu. in., with chassis designed for two-seated and four-seated bodies. The Morris is one of the most popular examples of this type, with a four-cylinder, 2¾ x 4-in., water-cooled motor; it sells at £446 with four-passenger body and at £340 with reduced equipment and less elaborate finish. With two-passenger bodies prices are £400 and £300 respectively—the latter a reduction of 30 per cent since last year.

Above the Morris class in point of engine size (or chassis dimensions) come the new 12-hp. Austin (100 cu. in.), the 11-hp. Humber (the 10-hp. of the 1920 show enlarged to 106 cu. in.), the 11-hp. Standard enlarged to 118 cu. in., the 14-hp. Sunbeam, also 118 cu. in., and numerous others.

All of these cars, from the 61-cu.-in. Rover to the 118-cu.-in. Standard, except the Humber, Austin and Sunbeam, are offered as light cars, and their makers are annoyed if anyone suggests that they are not light cars.

Features of British Light Cars

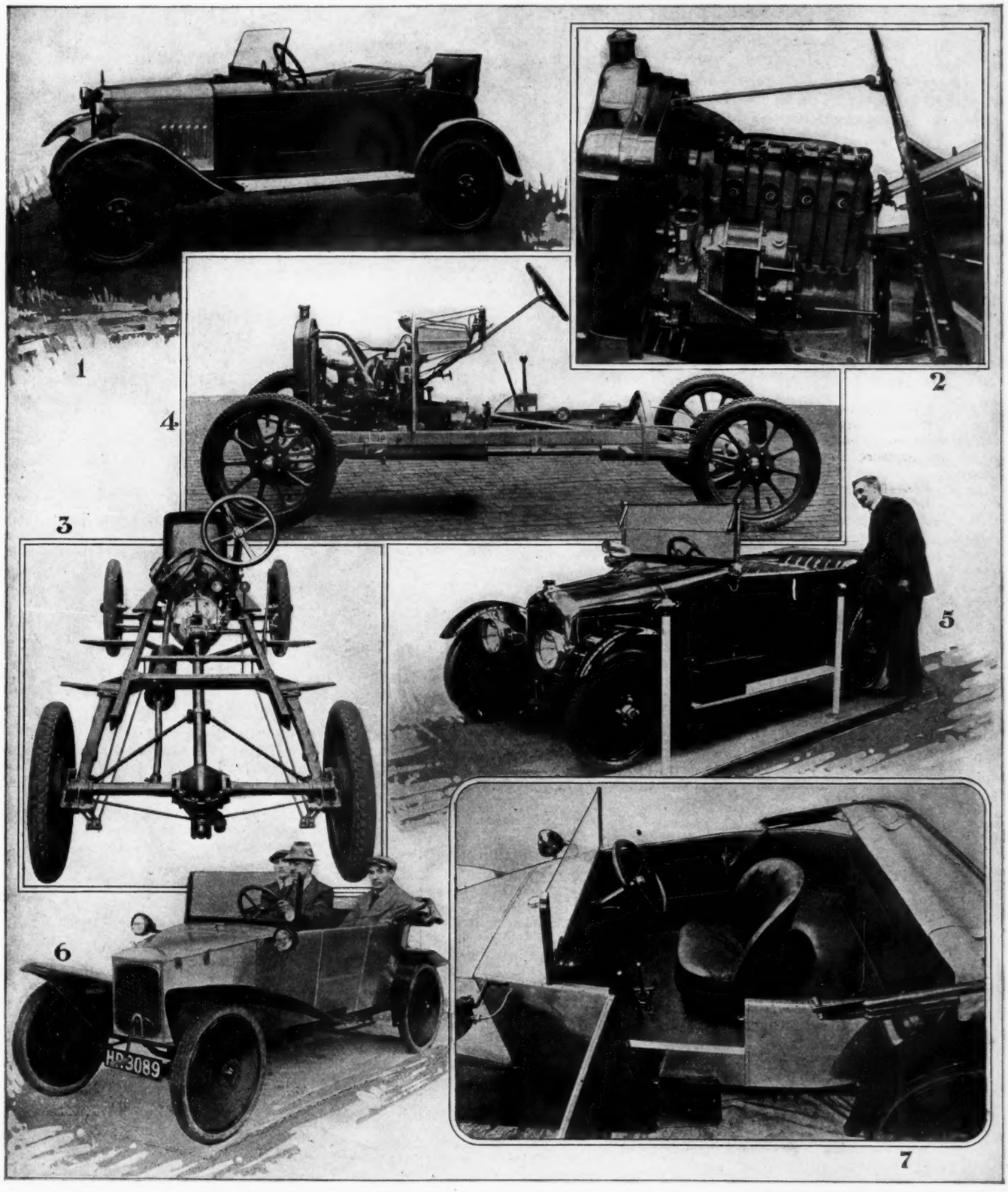


Fig. 1—New B. S. A. two-cylinder air-cooled runabout. Fig. 2—Overhead valve engine of new 8-hp. Standard. Note combined magneto and lighting dynamo. Production model will have battery ignition. Fig. 3—Rear view of new two-cylinder (65 cu. in.) air-cooled B. S. A. chassis, which is offered with two-passenger body at $1,700. Has three speed gearset, Lanchester worm drive and full electric equipment. Fig. 4—Chassis of new 7-hp. (60 cu. in.) Wolseley two-cylinder water-cooled engine. Fig. 5—10-hp. (67 cu. in.) Singer with four-passenger body with attendant alongside to give the idea of size. Fig. 6—New 9-hp. 3⅜ x 3½ two-cylinder air-cooled Stonelelgh (Armstrong-Siddeley). Occupants indicate seating arrangement and general dimensions. Fig. 7—Inverted clover leaf body on new Stonelelgh (Armstrong-Siddeley) air-cooled two-cylinder chassis

One maker who has increased his engine dimensions, giving the car a rating by the usual formula considerably above what it was last year, has reduced the "catalog horsepower" to a lower figure than last year, fearing that otherwise his productions would no longer be looked upon as light cars by potential purchasers, and that he would lose sales in consequence.

From one point of view the majority of British light cars sell at prices which are absurdly high when compared with those of the Ford, Overland, Chevrolet and even the Cubitt, the latter a British production with a 3⅛ x 5½-in., four-cylinder engine, four speeds, 126-in. wheelbase and full-sized, five-passenger body, selling at £442. These high prices can only be accounted for by high quality in the chassis, bodywork and equipment.

But first cost is not considered so important as operating costs by the majority of British buyers of light cars. They are willing to put up with the frequent gear-shifting accompanying the small engines if by doing so fuel economy will result. They far prefer the Morris, for instance, capable of running 30 to 35 miles per gallon (Imperial gallon) to the Cubitt doing 16 to 20, though both can be bought at approximately the same price and the engine of the first has only 94 cu. in. displacement, as compared with 170 cu. in. for the second. Not that the Cubitt is unpopular in its sphere, but it does not make so extensive an appeal as the light car.

Reverting to the smallest types, in the writer's opinion the policy of using two-cylinder engines is one of which the wisdom may be doubted when prices are not kept down to somewhere about the Rover level (£220). While these motors, especially the horizontally opposed type, run quite nicely at all except very low and high speeds, and certainly pull better on hills than many of the high-speed fours of similar cubic capacity, they have been accepted so far merely because the buyers feel they must sacrifice something in making their demands for low price and low operating costs. But if, as in most cases, they approach closely the price of the corresponding four-cylinder chassis, it is difficult to see what inducement they offer—beyond in some cases a better finish, perhaps, and a rather more complete equipment.

Following are outline specifications of a few examples of each type of British light cars:

11 Hp. A. C.

Engine—Four cylinder, detachable L head cylinders, 2¾ x 3⅛ in., 91 cu. in. displacement, aluminum pistons, three bearing crankshaft, pressure lubrication, magneto ignition.

Transmission—Dry single plate-clutch, gearset unit with rear axle, three speeds, right-hand lever, enclosed propeller shaft, top worm final drive, 4.5 to 1 ratio, full floating rear axle.

Chassis—Quarter elliptic springs, brake on final drive shaft and internal brakes on wheels, worm and worm wheel steering, disk wheels, 28 x 3½ in. tires; weight: 1550 lbs. two-seater with dickey.

Equipment — Two-seated body, electric lighting and starter, £550. Four-passenger body optional.

B. S. A.

Engine—Two cylinders at 90 deg., air cooled, integral heads, overhead valves, 3½ x 3⅜ in., 65 cu. in. displacement, aluminum pistons, ball bearing crankshaft, roller bearing big-ends, circulating splash lubrication, magneto ignition.

Transmission—Single plate clutch with cork inserts. Gearset unit with engine, three speeds, central control, enclosed propeller shaft, Lanchester bottom worm final drive, 4.8 to 1 ratio, non-floating rear axle.

Chassis—Quarter elliptic springs, both brakes within rear wheel drums, rack and pinion steering, disk wheels, 28 x 3½ in. tires; weight of complete car 1,350 lb., wheelbase 96 in., track 48 in.

Equipment—Two-seated body with single dickey seat, electric lighting and starting, £340.

10 Hp. Calthorpe

Engine—Four cylinder, integral L heads 2⅞ x 3¾ in., 76 cu. in. displacement, aluminum pistons, plain bearing crankshaft, trough and pressure lubrication, magneto ignition.

Transmission—Dry single plate clutch, amidships gearset, three speeds, right-hand lever, open propeller shaft, spiral bevel final drive, 4.3 to 1 ratio, full floating back axle.

Chassis—Half elliptic springs, internal brake on gearset, internal shoes on wheels, worm and segment steering, pressed steel hollow spoked wheels, 28 x 3½ in. tires; weights: chassis, 1350 lb., two-passenger complete car, 1650 lb., four-passenger car, 1700 lb.; wheelbase 99 in., track 45 in.

Equipment—Two or four-passenger bodies optional, electric lighting and starting, price £355 with two-seated body.

Crouch

Engine—Two cylinders at 60 deg., water-cooled, overhead valves in detachable heads, 3¾ x 4⅛ in., 75 cu. in. displacement, cast iron pistons, crankshaft supported at rear end only on ball and roller bearings, roller bearing big ends, circulating splash lubrication, magneto ignition.

Transmission—Dry single plate clutch, gearset unit with front end of propeller shaft casing, three speeds, central lever, enclosed propeller shaft, spiral bevel final drive, 4.5 to 1 ratio, no differential, non-floating rear axle.

Chassis—Quarter elliptic springs duplicated at the front, both brakes within rear wheel drums, rack and pinion steering, detachable wire wheels, 28 x 3½ in. tires, weight: chassis 900 lb., wheelbase 114 in., track 45 in.

Equipment — Two-seated body, electric lighting, starting by usual crank but engaging with camshaft, automatic decompression device, price £275.

11 Hp. Humber

Engine — Four cylinders, detachable L heads, 2⅛ x 4¾ in. 104 cu. in. displacement, aluminum pistons, three-bearing crankshaft, white metal bearings, trough and pressure lubrication, magneto ignition.

Transmission—Inverted cone clutch with leather facing running in oil, unit gearset, four speeds, right-hand lever, open propeller shaft, straight bevel final drive, 4.3 to 1 ratio, full floating rear axle.

Chassis — Half-elliptic springs, external brake on gearset and external brakes on rear wheels, worm and worm wheel steering, pressed steel wheels, 30 x 3½ in. tires; weight: chassis 1260 lb., two-seater with double dickey 2100 lb., four seated 2200 lb., wheelbase 105 in., track 55 in.

Equipment — Two-seater or four-seater optional, electric lighting and starting; price £620, four-passenger.

12 Hp. Morris

Engine — Four cylinders, detachable L heads, 2¾ x 4 in., 94 cu. in. displacement, cast iron pistons, three bearing crankshaft, white metal journals and big-ends, trough and pressure lubrication, magneto ignition.

Transmission — Double plate clutch with cork inserts, gearset unit with engine, three speeds, central lever, enclosed propeller shaft, spiral bevel final drive, 4.75 to 1 ratio, semi-floating rear axle.

Chassis — Half-elliptic springs at front, three-quarter elliptic at rear, both sets of brakes internal on rear wheels, worm and worm wheel steering, hollow spoked steel wheels, 28 x 3½ in. tires; weight: chassis 1200 lb., two-seater car 1800 lb., four-seater 1900 lb., wheelbase 102 in., track 48 in.

Equipment—Two or four-passenger bodies optional, electric lighting and starting, prices from £300 (with electric lighting only and two-passenger body) to £446 with full outfit and four-passenger body.

8 Hp. Rover

Engine—Two cylinders, air-cooled, set at 180 deg., detachable L heads, 3⅜ x 3½ in., 61 cu. in. displacement, cast iron pistons, roller bearing crankshaft, roller bearing big-ends, circulating splash lubrication, magneto ignition.

Transmission—Dry single plate clutch, gearset unit with engine, three speeds, central lever, open propeller shaft, bottom worm final drive, 4.8 to 1 ratio, semi-floating back axle.

Chassis—Quarter elliptic springs, brakes both internal on rear wheels, rack and pinion steering, disk wheels, 28 x 3 in. tires; weight: chassis, 700 lb., car complete, 1000 lb., wheelbase, 88 in., track, 46 in.

Equipment—Two-seated body with a small boot for spares, extra wheel and tire, dynamo lighting. Price, £220.

10 Hp. Singer

Engine—Four cylinders in pairs, integral L heads, 2⅜ x 3⅞ in., 67 cu. in. displacement, cast iron pistons, three-bearing crankshaft, white metal journals and big-ends, trough and pressure lubrication, magneto ignition.

Transmission—Inverted cone clutch, gearset as unit with front of propeller shaft casing, three speeds, right-hand lever, spiral bevel final drive, 4.5 to 1 ratio, semi-floating rear axle.

Chassis—Quarter elliptic springs, both brakes internal on rear wheels, worm and segment steering, disk wheels, 26 x 3 in. tires; weight: two-passenger car complete 1430 lb. wheelbase 96 in., track 48 in.

Equipment—Two-seated body with single dickey, electric lighting and starting, price £400. Four-passenger car, £420.

8 Hp. Standard

Engine—Four-cylinder water-cooled overhead valves push-rod operated, 2 1/16 x 3½ in., 67 cu. in. displacement, aluminum pistons, ball bearing crankshaft, plain bearing big-ends, circulating splash lubrication with thrower disk on crankshaft in place of pump, battery ignition.

Transmission—Single plate clutch, gearset front end of propeller shaft, three speeds, right-hand lever, enclosed propeller shaft, bottom worm final drive, 5.1 to 1 ratio, semi-floating rear axle.

Chassis—Quarter elliptic springs, internal wheel brakes, worm and worm wheel steering, disk wheels, 28 x 3 in. tires, wheelbase 102 in., track 48 in.

Equipment—Four-passenger body or two-passenger with double dickey optional, electric lighting, mechanical hand starter from seat, price £324 with either type of body.

9 Hp. Stoneleigh (Armstrong-Siddeley)

Engine—Two cylinders, air-cooled, at 90 deg., integral heads, overhead valves, 3⅜ x 3½ in., aluminum pistons, plain bearing crankshaft, articulated connecting rods, phosphor bronze big-end, pressure lubrication, magneto ignition.

Transmission—Single plate clutch, gearset unit with front end of propeller shaft, three speeds, central lever, enclosed propeller shaft, spiral bevel final drive, 5 to 1 ratio, no differential, non-floating rear axle.

Chassis—Quarter elliptic springs, brakes internal on rear wheels, worm and segment steering, disk wheels, 28 x 3 in. tires; weight: complete car, 1200 lb., wheelbase 8 ft., track 4 ft.

Equipment—Three-seated body, inverted clover leaf pattern, driver's seat, steering wheel and controls central, electric lighting, crank starting, price £225.

7 Hp. Wolseley

Engine—Two cylinders, water-cooled, 180 deg., integral L head cylinders, 3¼ x 3⅝ in., 60 cu. in. displacement, aluminum pistons, plain bearing crankshaft, circulating splash lubrication, battery ignition.

Transmission—Inverted cone clutch, gearset unit with engine, three speeds, right hand lever, open propeller shaft, spiral bevel final drive, 5.1 to 1 ratio, non-floating rear axle.

Chassis—Quarter elliptic springs, rear ones supplemented by single thick leaf, secured above frame to assist in taking torque and drive; both brakes internal on rear wheels, worm and worm wheel steering, pressed steel wheels, 26 x 3 in. tires; weight: chassis 800 lb., complete car 1050 lb., 97 in. wheelbase, 44 in. track.

Equipment—Two-seated body, electric lighting, mechanical hand starter from seat, price £310.

10 Hp. Wolseley

Engine—Four cylinders, overhead camshaft, 2 1/16 x 3¾ in., 76 cu. in. displacement, aluminum pistons, plain bearing crankshaft and big-ends, trough lubrication, battery ignition.

Transmission—Multiplate clutch in oil, amidships gearset, three speeds, right hand control, semi-enclosed propeller shaft, bottom worm final drive, 5.25 to 1 ratio, semi-floating rear axle.

Chassis—Quarter elliptic springs, internal wheel brakes, worm and worm wheel steering, hollow spoked steel wheels, 28 x 3½ in. tires; weights; chassis 1000 lb.; two-passenger car, 1550 lb.; four-passenger, 1770 lb., wheelbase, 99 in., track, 46 in.

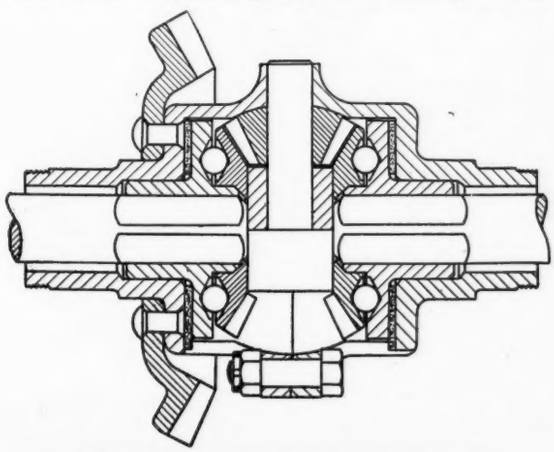
Equipment—Two or four-passenger bodies optional, electric lighting and starting, price £525 with four-passenger body, rear seats very cramped for two normal sized adults.

A New Self-Locking Differential

AMONG the earliest types of that form of differential gear having provisions made for so much internal friction that it is impossible for the car to be stalled by one of the driving wheels losing traction, was that patented in England in 1911 by Gavin C. Goodhart. Goodhart's early design was quite effective but was discarded as being too expensive to manufacture. The main difficulty of the problem is to obtain surfaces sufficiently large and durable to absorb the friction and withstand the high pressures within the limits of size available. At the same time the device must be simple, easy to manufacture, cheap and effective.

Goodhart has recently developed another design which he claims overcomes the difficulties met with in his earlier model. This new differential has been tried out by the Vulcan Motor Co. on a 2-ton worm-drive truck and by H. G. Burford & Co. on a 2½-ton internal gear drive truck.

The Goodhart differential is of the ordinary bevel type with certain modifications. The side gears are made in two parts, viz., the gear itself, which has a ring of conical depressions on its back and is not fixed to the axle directly; and the coupling piece, fitted directly on the axle in the ordinary way and carrying on its front face a ring of depressions similar to those on the back of the gear and registering with them. Steel balls are placed in these depressions between the two parts of the sun wheels.



Sectional view of Goodhart differential gear

These balls transmit the drive, and in so doing try to climb up the sides of the conical depressions, thus causing considerable axial thrust, which is taken on disks of "Ferrobestos" fitted between the flange of the coupling piece and the inside of the housing. The inward thrust, which is somewhat less than the outward thrust due to the outward thrust of the bevel teeth having to be subtracted, is taken on a hardened steel thrust block in the center, which prevents the gear teeth being forced into mesh too deeply.

The aggregate friction thus set up restricts differential action to such an extent that it only takes place when required, while at all other times the gear works as though the axle were divided.

Belgian Engineers Want Tariff Changed

A HIGHER measure of protection against foreign competition is being asked by the general engineering industry of Belgium. Five hundred manufacturers, including all those in the automobile industry, have petitioned the Financial Department in favor of a higher tariff, particularly against German products, and either a greater degree of protection or reciprocity with France. The Belgium automobile import duty is at present 20 per cent, while the French duty is 45 per cent; as a consequence French makers can sell automobiles in Belgium, but it is very difficult for Belgians to compete on the French market. Germany, by reason of the low value of the mark, is becoming a very dangerous competitor on the Belgian market, while the sale of Belgian automobiles in Germany is almost impossible.

It is believed that an arrangement will be arrived at whereby the import duty against German goods will be increased and the French duty dropped to the level of that of Belgium.

Refinements in 1922 Handley-Knight

Changes made in the new model include stiffening of frame, lighter and more easily operated controls, substitution of metal for fabric joints and improved battery mounting. Two new closed bodies are added to line.

By J. Edward Schipper

FOR 1922 the Handley-Knight chassis has been somewhat changed and refined and two closed bodies, sedan and coupe, added to the line. The touring body remains the same, but the new chassis is used for this as well as for the two new closed bodies, these three body types comprising the line.

The changes in the chassis are largely concerned with giving greater durability through a stiffer and more substantial structure and to increase the convenience of the driver by making the control pieces lighter and, consequently, more readily handled. Some of the changes also have to do with appearance.

The changes in the control system include a rearrangement of the braking mechanism so as to give a greater leverage and, consequently, a lighter pedal action. The gearshift lever is also more conveniently located and operated. Another change on the control is an improvement and rearrangement of the brake equalizing mechanism to give more complete equalization.

The entire propeller shaft assembly has been redesigned and a heavier propeller shaft employed, and in place of the fabric universals Spicer joints are now employed. The Handley-Knight engine has not been altered in any detail except the ignition, which is now the Auto-Lite system.

The structural changes include a stronger tire carrier and a stronger battery box, the latter being supported by two heavy brackets. For greater durability the wiring system has been completely inclosed in conduits and the wiring has been rearranged and simplified.

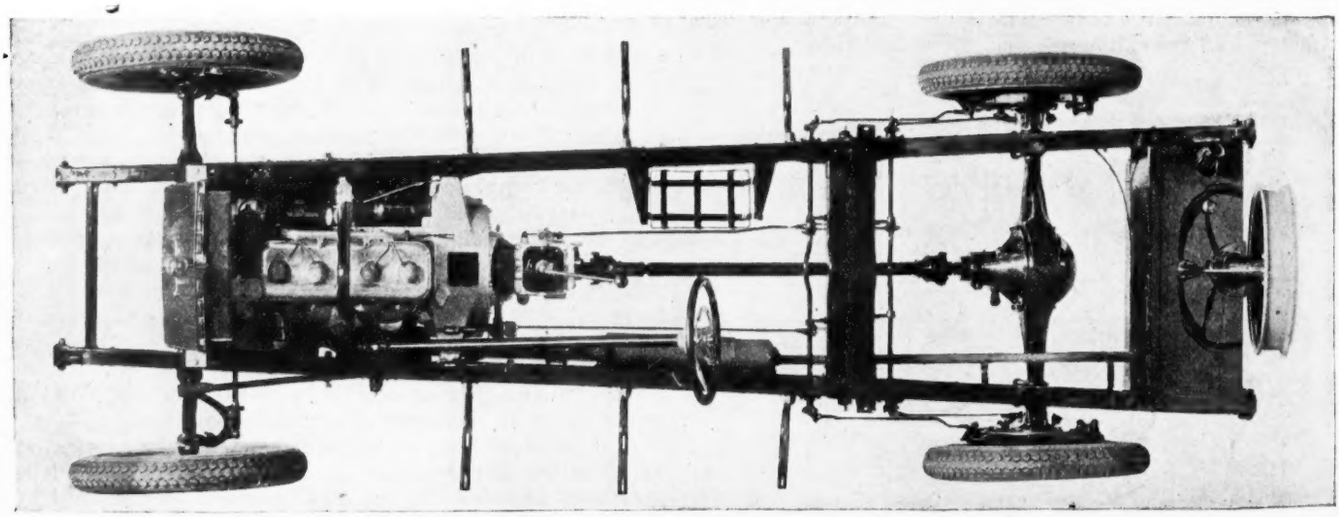
The changes which have been made for better appearance include wider, deeper and heavier fenders. Thicker running boards, which are now covered with aluminum instead of linoleum. There is now an aluminum cast trim rail running along the sill at the hood line from the end of the cowl to the radiator. The chassis is now lubricated by the Empress oiling system, which employs a high-pressure oil gun.

The two new closed bodies are the sedan-coupe, which seats four or possibly five, and the sedan, which seats seven. The sedan-coupe justifies its name in its appearance, as it is longer than a coupe body and shorter than a sedan. The seating arrangement is of course, controlled by the two-door body. There are individual chairs at the front, with the seat beside the driver tilting forward, leaving a passageway to the rear. The rear seat is continuous and provides room for two passengers readily and three in an emergency.

The seating in the sedan is the regular seven-passenger layout, with two continuous seats in the front and rear compartments and extra folding seats for two passengers. The seats in both models are tilted at an angle and are all supported by extra heavy cushion springs, deeply padded.

One of the features of the sedan-coupe is the large luggage space available. This is reached by lifting the back of the rear seat, disclosing the entrance to the compartment under the rear deck. With this arrangement the baggage can only be reached from inside the body, which assures protection for the baggage when the doors of the body are locked.

The fundamental specifications of the car have not been altered. The engine is a Handley-Knight sleeve-valve type with 4⅛-in. bore and 4½-in. stroke. This engine is cooled by thermosyphon and is equipped with Auto-Lite starting, lighting and ignition; Timken axles with Hotchkiss drive and a Gemmer steering gear are employed. The wheelbase is 125 in.



Plan view of new Handley-Knight chassis. Note heavy cross member and substantial mounting of battery container

A Dutch Passenger-Carrying Monoplane

Fokker machine now in this country carries six passengers or pay load of 1,000 lbs. with fuel enough for 500 miles. Employs internally braced, veneer covered wing and 200 hp. B. M. W. engine in aluminum sheet covered compartment. Comfortable accommodations for passengers.

By P. M. Heldt

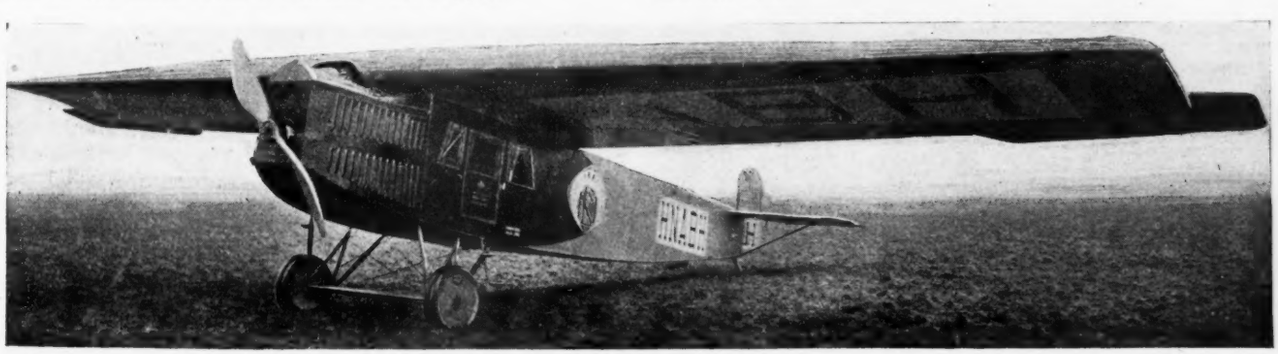
THE remark has often been made that airplanes designed primarily for war purposes are unsuitable for commercial uses. On the one hand, it is impossible with these machines to provide comfortable accommodations for passengers, while, on the other, they are designed mainly for speed and other characteristics that are paramount in war, but without regard to economical operation. It is this factor of economical operation that will mainly determine the success or failure of any enterprise established to carry passengers through the air, assuming that the matter of safety has been given due consideration.

It is a rather surprising fact that whereas there are numerous aircraft passenger services apparently in successful operation in Europe, in this country, where distances are, on the whole, much greater, such services are rare or non-existent. Some of the European lines make use of Fokker monoplanes built by the Netherlands Aircraft Mfg. Co., and of these there are several in this country. This machine is referred to as a six-passenger limousine monoplane, and its outstanding features are comfortable accommodations for the passengers and economy of operation.

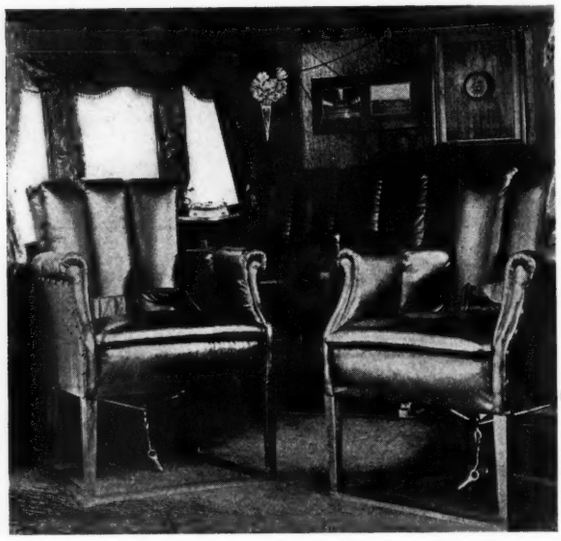
A machine carrying six persons with their baggage must necessarily be of considerable size, and would ordinarily be associated with a very powerful engine. But evidently owing to the form of wing construction with internal trussing used in the Fokker, which does away with all struts and truss wiring, the aerodynamic efficiency of this machine is very high, and the engine fitted is a B. M. W. of only 200 hp. output. The Fokker F-3, as this particular model is known, when carrying a full complement of passengers and fuel sufficient for a 5-hours' flight, consumes about 10 gal. of fuel per hour and develops a speed of about 105 m.p.h., thus giving it a flying radius of 500 miles with a 5-hours' fuel supply.

In the location of the fuel tank special attention has been given to the factor of safety. The tank is located between the big spars in the wing and feeds the carbureter through a single pipe by gravity. Being high up, the fuel tank is not likely to be damaged by a bad landing. The tank is so well separated from the passenger compartment that passengers may be allowed to smoke. The radiator is installed in the nose of the fuselage and in cold weather the pilot can regulate its temperature by means of shutters. The engine mounting is of tubular construction and is so arranged that the engine is easily accessible and can be quickly removed when required. For the sake of safety from fire, the whole engine compartment is enclosed with aluminum sheet. Next to the engine is located the pilot's cockpit, which is entered through a door in the side. In this way the pilot has the engine under observation at all times, and another advantage of this location of the pilot is that the engine controls can be mounted directly on the engine and need not be disconnected when the engine is to be removed.

The fuselage is constructed of steel tubing, a system with which Fokker has been very successful. The passenger compartment is roomy and well fitted up. There are easy chairs for five passengers, of which three are fixed and two movable, all facing forward. There are three large windows in each side, two of which can be let down for ventilation. Besides a clock and an altimeter, the usual fittings of a high class limousine are provided. On regular air lines a map of the route and air photographs of towns and points of interest along the route may be fixed on the front wall. The cabin is entered by a full sized door two steps from the ground. Baggage space is provided between the back of the fixed seats and the rear wall of the cabin. Owing to the absence of a lower wing the view from the cabin is particularly free and unobstructed.



Fokker six-passenger limousine monoplane



Interior view of cabin

The wing is of the thick internally braced type; it has a span of 52 ft. 9 in. and is 25 in. thick at the center. It comprises two strong box spars to which solid three-ply ribs are secured with corner pieces. The whole wing is covered with three-ply wood, thus doing away with the rather perishable canvas covering. The calculated safety factor of the spars is said to be 7, but load tests have shown it to be even higher. The whole wing is fixed directly to the top of the body by means of four steel bolts which are calculated for a factor of safety of 14. Ailerons, elevators and rudder are balanced. The control cables for the ailerons are carried through the wings and the pulleys are accessible through inspection doors.

The weight of the machine empty is 2650 lb. and the load capacity is given as 1750 lb., which gives a very high useful load factor.

A neat arrangement is provided for the replenishment of the fuel supply. There is a hand pump located adjacent to the engine by means of which fuel can be pumped directly from the ground supply into the tank in the wing. This pump is fixed in position and is furnished with a length of gasoline hose.

A New Electric Coupe

A NEW Detroit Electric, to be known as the Model 90, four-passenger coupe, has recently been brought out. It is considerably lighter than the brougham model which has been standard with this company for some time. The new car weighs 3385 lb. as compared with 3900 lb. for the brougham. The weight has not been removed from any particular part of the structure, but the car is lighter throughout, both in body and frame, resulting in a slightly higher maximum speed of 25 miles per hr., and a range per charge which has shown itself to be better than 75 miles in and around Detroit.

Three persons can be accommodated on the rear seat, and a fourth in a pullman seat in the right front corner. A removable seat, which is placed in the left front corner, can be used by a fifth person. The rear seat width is 49 in. and depth 18 in. The distance from the front to the rear window is 63½ in., and from the top of the cushions to the roof 38 in. The door opening is 24 in. The car is trimmed in whipcord with Turkish type of upholstery. The panels are painted either in Cobalt, dark blue with light blue stripes or Brewster green with light green stripes. The front and rear hoods, top, upper body structure and fenders are black. Wood wheels are painted to match the panels. Wire wheels, when ordered, will be painted white, cream, red, blue or green.

The new 4-passenger Detroit electric coupe

The battery equipment is a Philadelphia Diamond grid, 42 cell, 13 plate. There are five speeds ranging as follows: 6, 10, 15, 20 and 25 miles per hr. The tires are Firestone pneumatic cord size 32 by 4 in. The equipment consists of two headlamps, two body parking lamps, one rear signal lamp, interior dome light, electric Klaxette horn, Hanlon rain vision shield, Warner speedometer, volt and ammeter, charging plug and tools.

Utilizing Wood Waste and By-Products

A SYSTEMATIC survey to determine the possibilities of more complete utilization of by-products, low-grade material and wood waste has recently been undertaken by the newly reorganized Industrial Section of the Forest Products Laboratory at Madison, Wis.

An important part of the survey will include the location and development of new markets for material heretofore considered as waste or unsuitable for a particular branch of work. It is felt in many forestry circles that many wood-using industries are consuming valuable material for making various products in which a cheaper grade of wood could just as well be used. The service will include an exchange which is intended to bring producers and consumers in contact with each other in order to effect a more complete utilization of this material. The service of this exchange will be free to the public. It will include two reports, one on opportunities to buy waste and the other on opportunities to sell waste. The first will contain names and addresses of lumbermen and factories having such material to sell, together with a detailed description of the character, quality and quantity of such material. The other will contain names and addresses of factories in the market for wood waste and the sort of material they desire. With these reports will be furnished, from time to time, suggestions for new markets and new uses for waste material.

The Forest Products Laboratory will make a special study of wood-using industries with a view to determining to what extent cheaper grades of wood can be used in each particular field.

Details of Body Design at the New York Salon

Close coupled bodies equipped with trunk racks at the rear feature most inside driven cars. The stationary windshield has become popular while devices on the shroud and top provide ventilation. The leather or fabric visor was also much in evidence. Disc wheel losing favor. Designs in the cars exhibited offer an indication of trend in future production work.

By George J. Mercer

A CAREFUL and thorough investigation of the motor car bodies exhibited at the New York Salon held last week, brings to light many features of interest to the men in the industry. The advances made in body design may be taken, in a certain sense, as an indication of the trend of designs that will later be used for manufacturers who build in large quantities.

As stated in a general survey of the salon in last week's issue of AUTOMOTIVE INDUSTRIES, there were about 60 bodies exhibited. This is not a large display, so far as numbers go, but it should be remembered that the salon represents the collective work of many of the best body style originators in the east. There were 13 body builders having space. Then, too, the industry has passed through a period of depression and this exhibition may mean much in the way of future business. Increased output is a universal desire and it can readily be seen that the best efforts have been put forward to make this show more distinctive than any that has been held for many years.

Many Berlines Shown

The principal feature of this year's changes is the increased number of berlines. By this term is meant a body that has the appearance of a sedan but has a division between the rear and front seats, making it a two-compartment body. When the inside drive body was first introduced there was considerable hesitation on the part of manufacturers as to the number of doors and the necessity for having a division at the back of the driver. The small wheelbase car has been gradually evolved and its use does not permit such a division because the driver's seat extends too far back into the rear doorway. Consequently most sedan types have, in the past, been made with a single compartment. This show, however, demonstrates that the two-compartment body is required by many purchasers.

Another new feature was the enclosed drive cabriolet. This type of car is likely to be largely confined to the special body class of trade, since it does not lend itself to a production proposition as does the all metal body. As seen at the show it is a slight parody on its name, in that, while it has the appearance of being collapsible, in reality it has a permanent roof body. This body is an adaptation of the English body that has been used abroad for many years, but as shown now it has more practical use for the American market because the doors are full and there are less loose parts to rattle and get out of order than on a true collapsible type.

There is one advantage this type of body may have over other forms of enclosed cars in quantity production. Efforts are being made to get such jobs down to a minimum price and the use of fabric, which is used instead of leather or metal for the tops and sides is a step in that direction. Consequently if this high type of enclosed body can be produced cheaply the advance will be easier.

Another feature embodied in this type is the close coupled idea. The close coupled body has many advantages. It is more sociable; it brings the rear seat forward of the rear axle and therefore makes the riding easier; it makes a lighter body and offers a more pleasing appearance. There is a strong tendency to make bodies that are intended for only five passengers as short as convenient and thus take care of the wish of the owner to carry a trunk or suit cases at the rear. All the short bodies exhibited are fitted with these trunk racks. Their use to cover space left on the frame back of the body is sure to increase. It is the only way to provide carrying space at the rear that will give a well-balanced appearance. The lack of spare room in this section does not permit the use of a sensible looking luggage compartment, for length is necessary for such a design. A trunk rack, on the other hand, can be fitted over the short space and also extend over the gasoline tank. Several examples of the trunk rack are shown in the accompanying illustrations. One is made by the Fleetwood Body Company for Packard (Fig. 5), and another is by Winton (Fig. 3). The illustration of the lock body on a Mercedes phaeton (Fig. 2) shows the trunk attached. An interior of a Pease body on a Packard (Fig. 17) shows a provision made for carrying suit cases in the tonneau. This body, however, also has a trunk rack at the rear.

Equipment and Interiors

As to the development of the interiors and appointments of inside driven cabriolets, the various makers have relied upon their individual tastes, as can be seen by the illustrations. Fleetwood presented one on the Lafayette (Fig. 27), with a slant front windshield. This is a gray painted job with a white stripe on the black moulding. The guards are also black. The equipment includes a leather visor and two-way windshield, the lower part being stationary. Ventilators are on the top and sides of the shroud and dash lamps are included in the equipment, as are dome and corner reading lamps. Seat pillows and foot cushions are provided and vanity cases are at the rear of the front seat. This location of

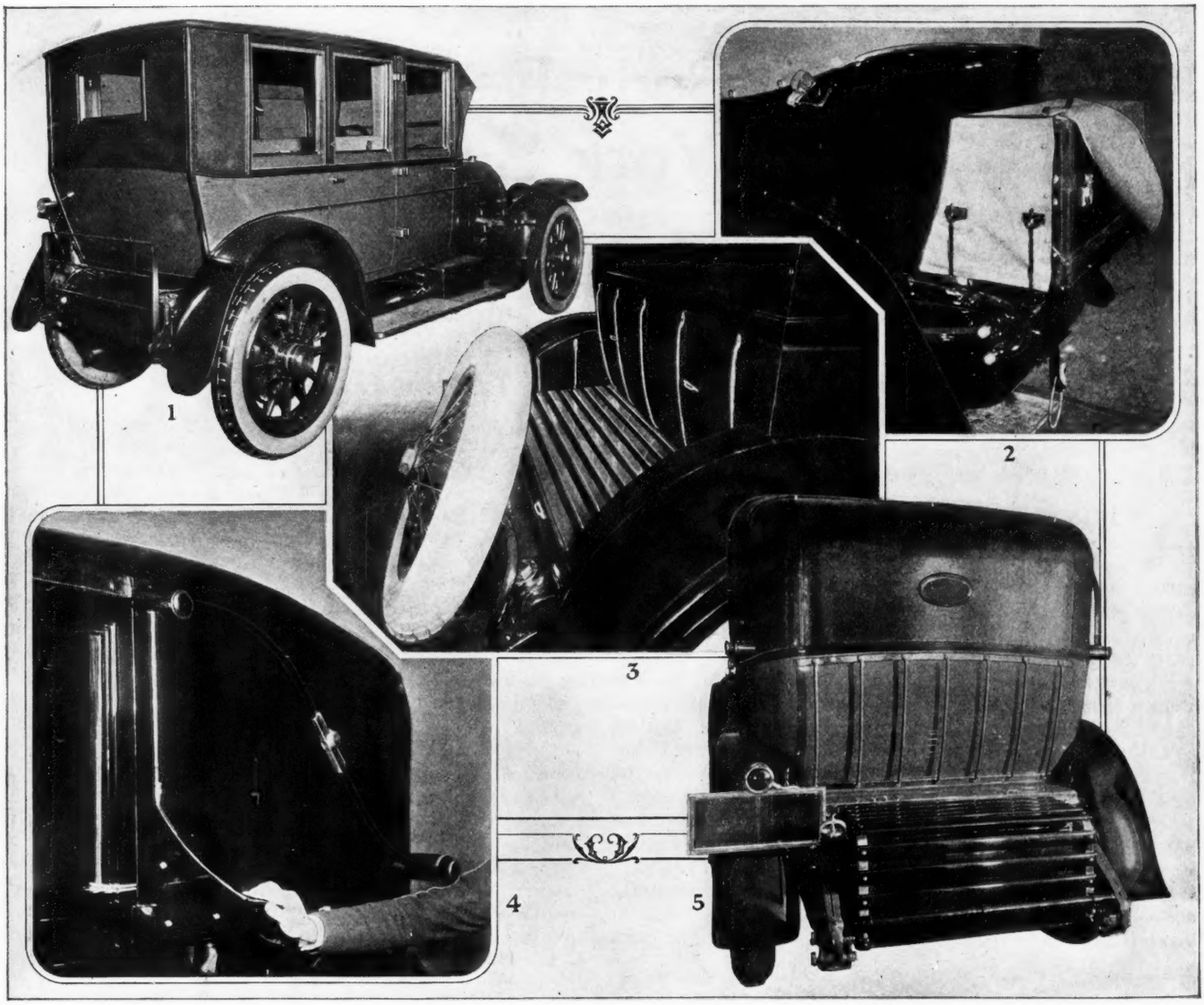


Fig. 1—Brewster berline showing new construction in which fabric panels are used for back and quarter. Fig. 2—The trunk rack and cover and method of fastening on a Mercedes. Fig 3—Trunk carrying arrangement on a Winton close coupled sedan. Fig. 4—Daniels cabriolet showing joint covered with flap. Fig. 5—A protecting device for trunk and trunk rack on a Fleetwood-Packard cabriolet

these latter articles is an improvement over the side position. The robe rail is directly below these vanity cases. The interior is trimmed with gray granite weave worsted fabric. The doors are trimmed plain and the seats and backs with straight pleat.

The Smith-Springfield body on a Rolls-Royce (Fig. 23) is an example of the straight front style. This is a gray body with a black stripe and two hairline gold stripes. A ventilator is on the shroud and the trimming is in gray Bedford cord.

The Murphy body on the Lincoln (Fig. 25) offers an example of the extremely close coupled body of the same class. This body is painted tango with black mouldings. The trimming material is wool velour of tango color and this model also has the vanity cases at the rear of the front seat. Cycle guards and steps are a part of the equipment. The illustration shows the car with both doors open and the close coupled effect is self-evident.

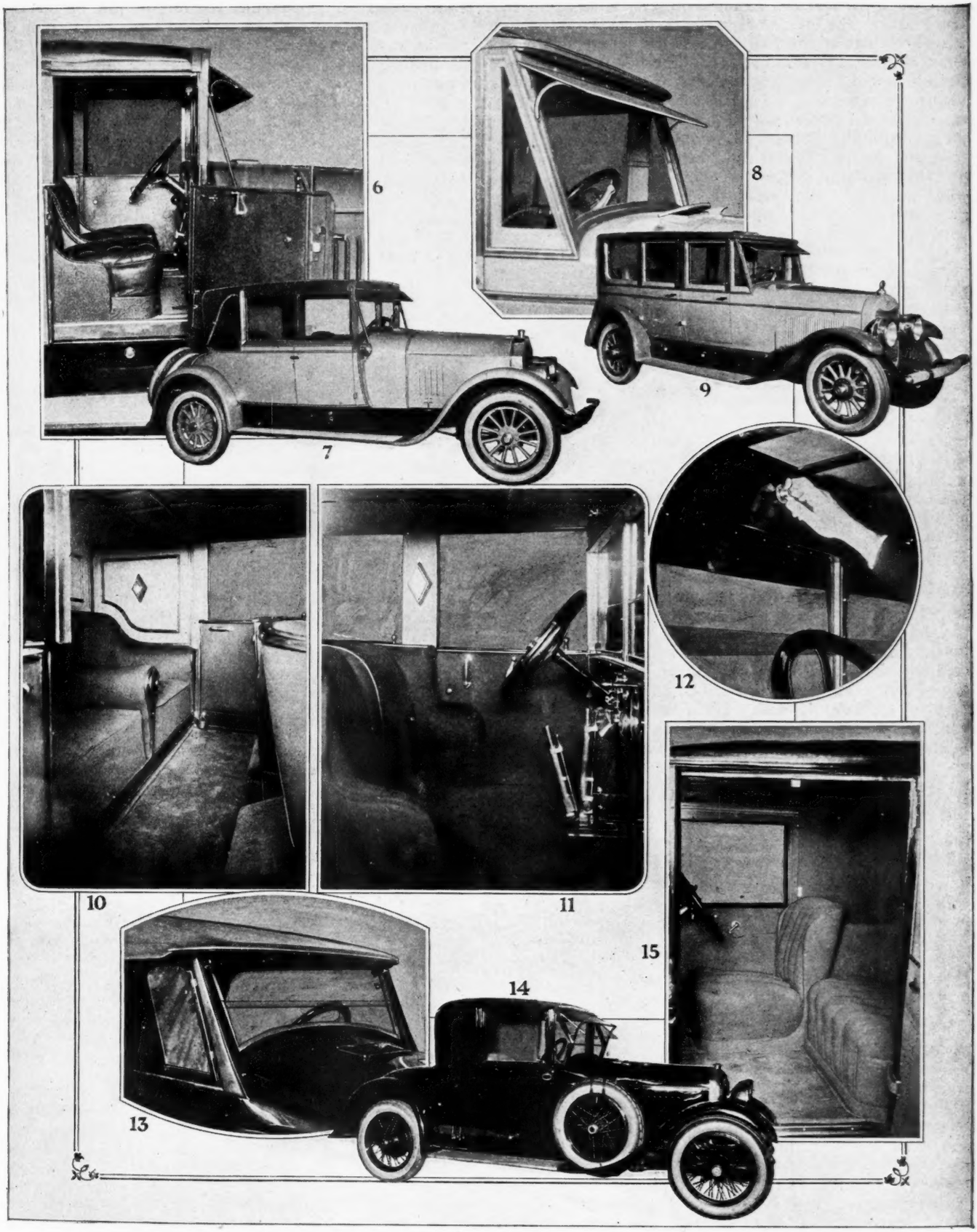
Two other types illustrated are Healey bodies; one on a Pierce-Arrow and the other on a Falcon (Figs. 7 and 26). The first is a two-door body, although Healey also builds four-door models. These bodies represent an exclusively new feature in door pillars and front corner pillars. Close-up views of the four-door body show this feature more clearly.

The first body is painted in two-tone green, the lower part being similar to sea green and the upper much darker with close double white stripes. Spanish green leather is used for trimming and the roof is skeleton lined. The top of the seats and border wood is circassian walnut. This wood has been used largely for interior door handles and the casing for the curtain roller on this model is made of the same material.

The Falcon body is an unusually light and close coupled body and was the lightest and lowest car at the show. It is painted green with black mouldings and upper part.

The illustration of the rear view of the Brewster berline (Fig. 1) shows that the use of fabric is becoming established as a body panel material. Here the rear, side quarters and the roof are so covered. This fabric is secured under mouldings that are put on after the job is painted and the wood screws show plainly. This method detracts from the appearance and in time other and better means for fastening the fabric will be devised. This will be necessary as fabric is to be gener-

Features of Some New Models Exhibited



Figs. 6 and 7—Healey-Pierce Arrow two door inside driven cabriolet showing small front pillars. Fig. 8—Lincoln inside driven cabriolet showing ventilator on shroud and leather visor. Fig. 9—Fleetwood-Lincoln berline. Fig. 10—Healey-Stevens Duryea inside driven cabriolet showing rear seat divided. Fig. 11—Healey-Stevens Duryea inside driven cabriolet showing front seat arrangement. Fig. 12—Novel windshield attachment on a Healey-Pierce Arrow inside driven cabriolet. Fig. 13—Murphy-Lincoln close coupled phaeton showing novel side windshield. Fig. 14—Smith-Springfield-Minerva coupe exterior with Brewster windshield. Fig. 15—Smith-Springfield-Minerva coupe showing seating arrangement

ally used for panels. The body on this car is painted a bronze green with black mouldings and white stripes. The illustration shows handles, hinges, windshield and trunk rack. The interior is skeleton above the waist line and the fabric of the rear and the quarter panels is exposed on the outside. This gives the body an extremely light look and is no doubt the forerunner of other bodies using the same idea. The interior trimming is a gray wool texture with brown pin stripe. The trimming is in plain pleats and buttons to maintain the shape on cushions and backs. The use of buttons was quite general on other makes of bodies. It is an improvement over the plain pleat and it permits the natural shaping of the cushion and back to the position of the body. It is more expensive, however, and can be used only on high grade bodies. The body also has ventilators on the top of the shroud and two in the roof. Arm rests on the rear seat enclose the vanity cases and dictaphone. A dome light is located at the top rear above the back light. The front compartment is trimmed in leather. Pipe and point design is used and the doors and body pillars above the waist are skeleton.

Use of Visor General

The use of a fabric or leather visor was general among the models exhibited. There was not a single car at the salon having a colored or frosted glass visor. There were a few with the three-way shield with plain glass, but the majority used either fabric or leather over sheet metal or a frame. The illustrations show two examples of this, one on a Lincoln (Fig. 8) and the other on a Pierce-Arrow (Fig. 6). This type of visor has been seesawed about for popularity since its advent about three years ago. According to the use made by exhibitors this year indications point to a more general use of the material. It can be made for less money and lessens the glass cost in a three-way shield, hence its adoption presents no obstacles. In this connection it should be mentioned that the average extension of the roof beyond the front of the body tended to be short. The Lincoln was one of the longest on exhibit. It might also be mentioned in passing that the sloping windshield was used exclusively on all berlines. Last year the straight front was leading on all enclosed bodies, but this year the reverse is true.

Windshields on both open and enclosed bodies had the lower part stationary and all made use of the ventilator on the shroud. New features on windshields were not much in evidence, Healey having the only radical departure from customary designs. This is shown in a close-up view of their body on a Pierce-Arrow (Fig. 12). The position of the hand serves to illustrate how the glass is operated by turning the handle which raises and lowers the glass perpendicularly. The Brewster windshield has been used on several bodies other than their own.

A new form of side wing for open bodies is shown in the illustration of the Murphy in Fig. 13. The frame work of this is of wood and is somewhat bulky, but the side wing feature is good.

The operation of raising and lowering the door glass has been brought about in a new way by Healey, as shown in Fig. 6. This method is used by the builder on several bodies. On the one shown the top is collapsible and the channel slides with the glass, but on bodies with permanent tops the channel is stationary and the glass alone slides in the groove upon the same principle that the regulation door glass is operated. The advantage of this feature lies in the fact that the body pillar can be made lighter as will be seen from the illustration.

The exhibits, from the viewpoint of uniformity, showed, on an average, a set that gives a fair indication of the future trend in design. This is true of both exterior and interior. For example, the larger part of the cars have nickeled radiators, larger headlights of circular design, and these for the most part are nickel finish. The windshields were often thus finished and the general exterior appearance is brighter. Of course the color scheme at the show is not much of an indication as to the general trend, as show cars are usually dressed up for the occasion. Still there were no loud color schemes. Grays, soft greens and brown with red or maroon finish were popular. In nearly all cases striping was the rule. Much of the brightness at the salon seemed to be brought out by the use of nickel parts. In this connection the use of dash lamps was quite common and sometimes these were larger than the conventional bull's-eye type.

The shapes of the radiators reflected little that is new. Most of them, except those of foreign makes, are of standard design. However, if any indication may be gleaned from the combination of body and hood lines, the use of rounded lines will be the rule. Some few bodies have square rear corners, but not enough to show any leaning in this direction. There was an indication of the resurrection of some of the older forms of appointments, such as pillar lamps on broughams, loop handles on the doors and tee moulding. It would be difficult to say whether the use of mouldings has lost or gained. There were more bodies with mouldings at the bottom than last year and there was the usual proportion with flush doors. Holbrook brought out an innovation in making use of the recessed panel effect on both open and closed bodies. This panel separates the upper and lower body and is painted a contrasting color. On the open body this panel effect is continued through the hood to the back of the radiator, thus giving the long straight line effect that is sometimes attained by the bevel edge or moulding. The bevel edge was shown on but two cars at the salon and this in a modified form on the fore part of town car bodies.

Soft Roof Makes Gains

The soft roof made rapid gains this year. There were not more than two bodies in the show that had solid roofs. Some of the bodies have metal covering over the corners and the soft panel in the center. The skeleton roof was shown in several cases and with splendid effect. It gives a light appearance to the interior and is suitable for an all year body.

The use of the enclosed rear quarter has increased considerably. It is not to be expected, however, that the use of this type will become popular with the general public. It does, however, indicate the use of smaller rear quarter windows on close coupled bodies and it is believed this practice will become more general in production work. Some of the cabriolets shown have very small back windows. This is permissible for chauffeur-driven cars of the town car type where the driver is outside, but for utility and safety the large back window has an advantage.

Ventilators are the rule on all cars. As was stated before the stationary lower part of the windshield as used at the show necessitates the use of the shroud ventilator. This is generally used at both the top and sides of the shroud. The use of a ventilator in the roof was also quite common and is a necessity when the rear quarter is without a window as many of the new designs are made. In fact, increased use of the roof ventilator may be looked forward to. It has a decided advantage in ventilating and increasing the comfort of the car.

From the illustrations shown, and the tendency indicated that bodies with fabric sides will increase, the ap-

Interior Features at the Salon

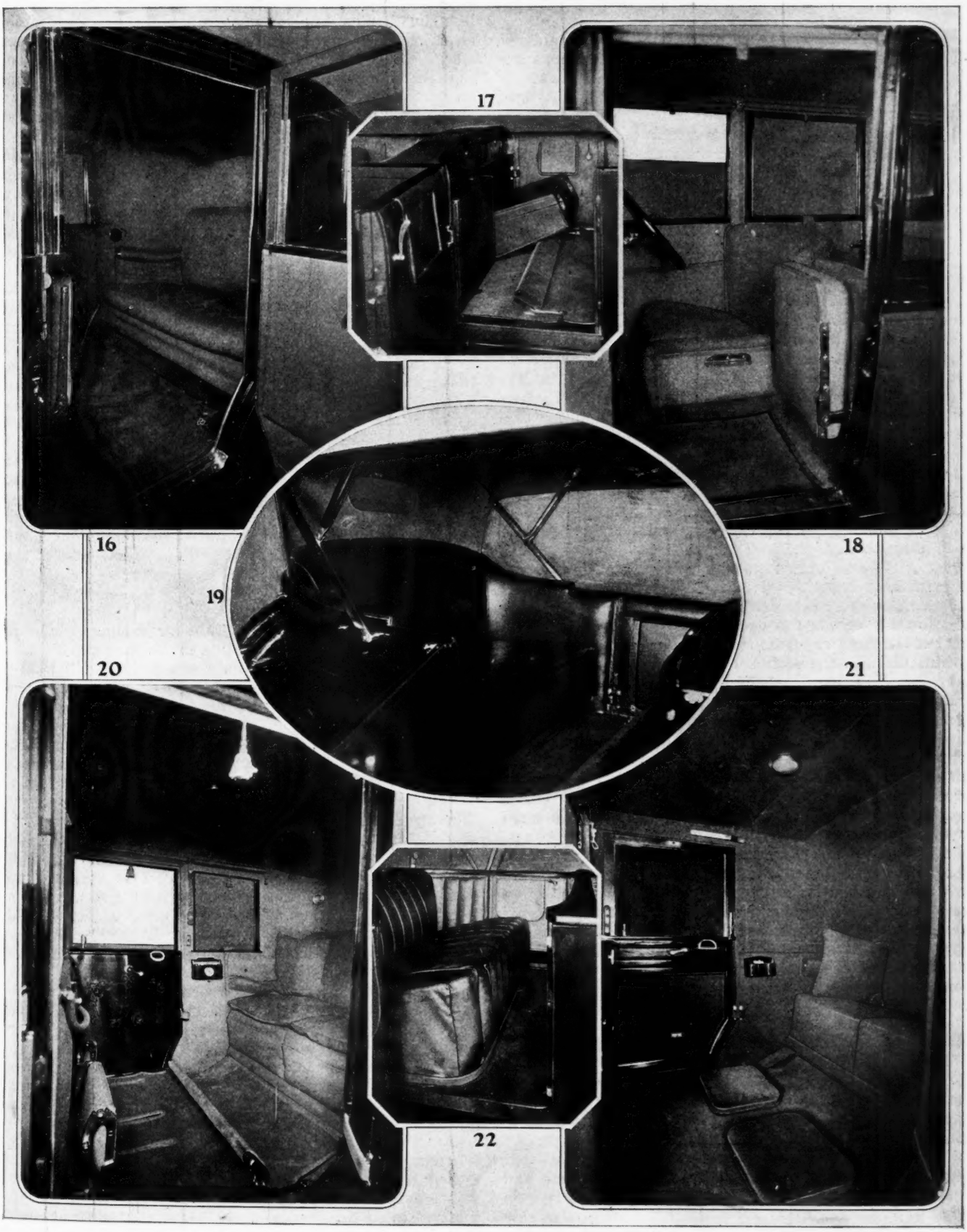


Fig. 16—Brewster cabriolet, showing interior trimmings. Fig. 17—Pease-Packard phaeton, showing arrangement of suit cases in tonneau. Fig. 18—Fiat inside driven two-door body, showing operation of folding seat. Fig. 19—Holbrook-Packard phaeton, showing trimming and wood bows of top. Fig. 20—Brooks Ostruk-Minerva cabriolet. Notice the natural wood finished interior. Fig. 21—Interior finish and seating of a Daniels cabriolet. Fig. 22—Rear interior of a Murphy close coupled phaeton

pearance of the roof will be thicker as viewed from the outside, because the corners will be more rounded to carry out the cabriolet effect that has been the parent of this new design.

The use of steps in place of running boards did not show any gain over other years. In fact indications are that the running board will hold its own because it shows a defined line that helps to emphasize the length of the car. At any rate the attitude of those who exhibited would indicate that the idea of replacing the running boards with steps had not met with much favor.

The mudguards that showed to the best advantage and those most in evidence, were the full crown shape, the rear following the contour of the wheel and well down at the back with a slight reverse curve and the front quite long before connecting with the running board.

Disk Wheel Losing Favor

The disk wheel did not have many devotees. Wire wheels were used to a considerable extent, and these, with the spoke wheel, made up the bulk of those shown. The carrying of the extra tire or wheel was fairly divided between the rear portion and on the side at the front. This does not mean much to the average car builder, because there has always been the proportion of cars in the larger cities that use the front position. The utility of the rear position, however, is well established for the majority of car users.

The correct method of hinging the doors on closed bodies does not seem to have been certified as yet. Doors were made to open in all ways possible. The safest way is to hinge them at the front, as most phaetons are made, but there is dissatisfaction with this method on the part of many as it is inconvenient for entrance or exit. Then, too, at times there is more or less mud on the rear guards and for this reason the door is best hinged at the back so that the handles of the two doors come together. This is illustrated in the picture of the Murphy inside driven cabriolet (Fig. 10).

Both the two and four-door variety of inside drive bodies were in evidence, but by far the larger number used the four-door model. Traffic on one way streets compels passengers to alight from the left side if they wish to alight on the left sidewalk. This is having its effect in bringing into favor the four-door body, therefore the close coupled body of this type is looked forward to by many as the body that will supersede the coupe. There was only one body of this miniature sedan shown. There was also but one coupe shown and there were only three conventional type sedans on exhibition. There were several two-door inside drive five-passenger bodies and one illustration of a Fiat (Fig. 18), shows the arrangement of swinging the seat to allow entrance to the rear while the Minerva (Fig. 15) shows the conventional coupe with hinged front seat and large entrance way.

Interior Trimmings

The interior hardware showed harmony in design and the dull silver finish prevailed. The dome light was the rule and this was placed in the center. For two compartment bodies one light was used on both compartments. Corner reading lamps have come back. In fact there was almost an ostentatious display of all that ever belonged in a body except the arm holders, and even these have come back to the extent that toggle grips were used in many cases. All the articles in this display have a use and they are of rich design and appropriate, but their arrangement was often such that their presence was exaggerated. For instance, grouped close together on many of the bodies, would be a natural wood vanity case with silver contents, a silver telephone, a regulator handle and a pull to handle, all of silver finish. Some bodies had arrangements that made these less conspicuous by different grouping. As an example, on the close coupled bodies, the vanity and smokers set were arranged on the rear of the front seat. Then, too, the inconspicuous telephone or dictaphone helped in this way. Brewster used the front end of the arm rest to contain these while Healey made use of a natural wood locker to contain them.

The hardware on one body is of very sombre shade and this helps to minimize the appearance of too lavish display of jewelry. Healey has the handles and many of the parts circassian walnut with silver finish. The use of highly polished natural wood finish mouldings around the windows in place of the dull finish helped to improve the interior harmony.

A few of the bodies were finished with natural wood panels and strips similar to the custom in use several years ago. Four illustrations of this are shown. The Brooks-Ostruk (Fig. 20) shows the entire door panel; the Daniels (Fig. 21) shows strips on the doors and the the two Healey bodies on Pierce-Arrows show circassian walnut trim on top of the seats and forming the armchair effect. This last was the most harmonious because it showed no sharp contrasts.

The dictaphone was placed on many of the bodies in an incorrect position, in that it was not convenient to make use of the instrument without bending one's body in a very uncomfortable position. It should be high enough and far enough forward so that when the hand is used to press the button the elbow will not cover the plate and virtually prevent its free use.

Fabrics Similar to Last Year

The fabrics used for the interior trimming of the closed bodies is the continuation of an idea started last year. Velour was used on only one body and partially used on one other. All the others used cloths with the exception of a few using leather. This latter was customary for trimming the front compartment of two compartment bodies. It is rarely used for the rear compartment as it is too cold. The predominating material was wool fabric. The color gray predominated with often a pin stripe of darker shade. Other shades were used, but they are few in number and the texture also was slightly different. The majority have the regulation short nap, but some using wool velour had the long nap that goes with this material. Broadcloths were also used to some extent as were Bedford cords and a few used a new material that has come out for this purpose called a granite weave worsted. The illustrations shown demonstrate the style of trimming. The interior of the Brewster cabriolet (Fig. 16) shows a plain pleat with buttons and the cushion made more like the old carriage cushion. The arm rests on most of the bodies have a pocket under them which is used as the receptacle for the telephone when not in use. The Brooks-Ostruk (Fig. 20) is also the interior of a cabriolet and shows pillows on top of the cushions, as well as the pillow at the back. Pillows were evident on many cars, one generally being placed in the corner and foot cushions were also general. The two views of the Healey show this body trimmed plain. The rear seat view also shows the locker in which the vanity case is stored and the shape of the foot cushions. The side lamps and the skeleton roof are also depicted and the view of the front seat shows in addition the narrow front pillar construction, the divided windshield and the side lamps.

As a rule all doors were trimmed plain and no welt used. At times a cord welt was used and some had a

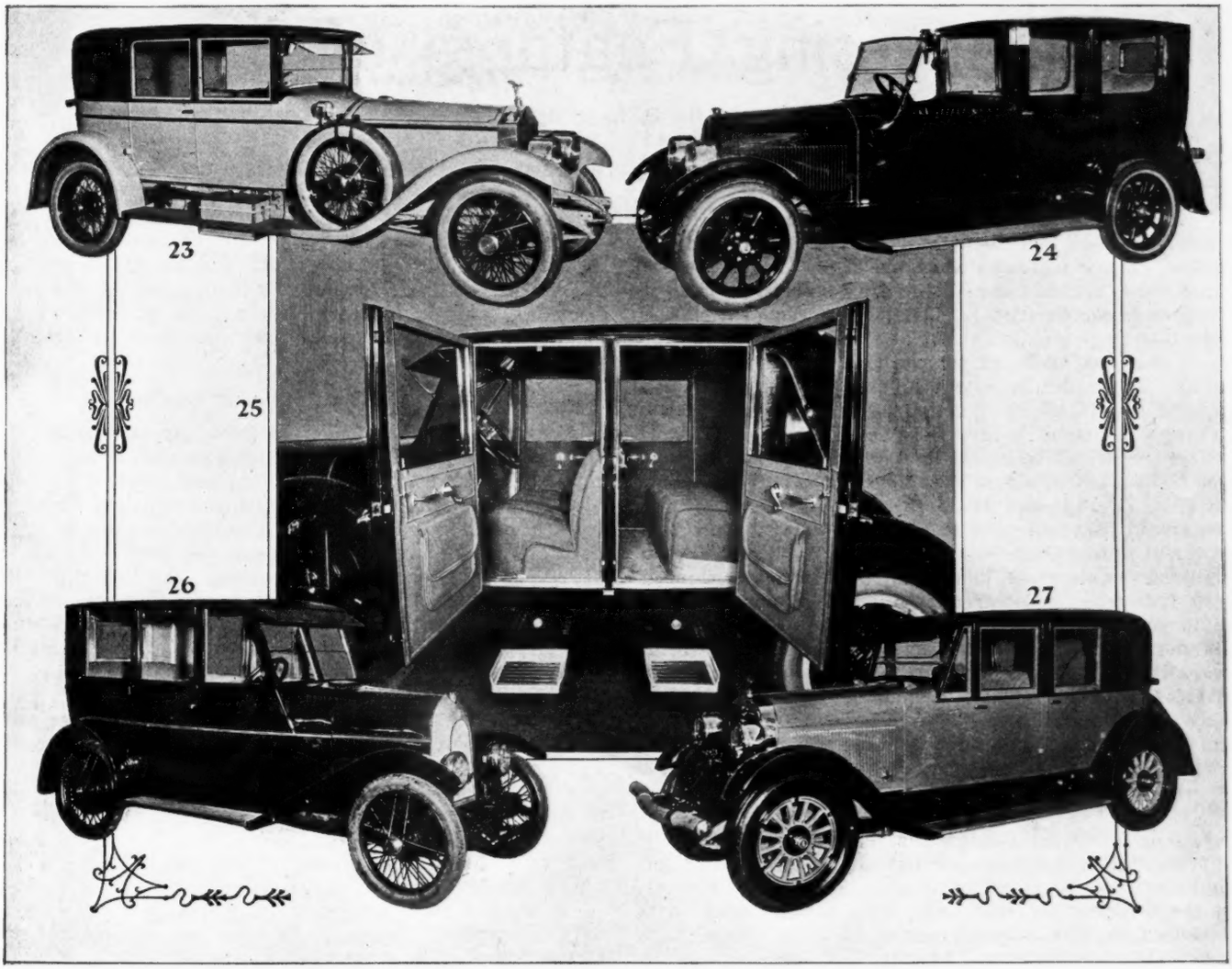


Fig. 23—Smith-Springfield-Rolls-Royce inside driven cabriolet. Fig. 24—Fleetwood-Fiat brougham. Fig. 25—Murphy-Lincoln inside driven close coupled cabriolet showing interior and arrangement of vanity cases. Fig. 26—Healey-Falcon two door inside driven cabriolet with quarter window. Fig. 27—Fleetwood-Lafayette inside driven cabriolet

carpet line at bottom. Manufacturers who are showing new samples of cloths are also displaying narrow lace, anticipating that this will come back into favor.

As to styles on trimming, there is a tendency to use buttons to some extent with a pleat to shape the seat cushion and back. There were a few bodies that showed the pipe and point design, but in all cases the appearance was always in evidence of a very soft, flexible cushion and back rather low as compared to former years. The look sought by all is to keep the car down and this can only be obtained by minimizing the interior sizes.

The open bodies included a Holbrook on a Packard (Fig. 19). This body has the recessed panel all the way round the back and to the radiator. The interior seating shows plain trim design, while that of the Murphy body (Fig. 22) shows the pleat. This latter illustration also shows the close coupled body and deep cushion and wood trim on the top edge of the seat. However, as shown, the height for the back is not sufficient for comfort, although the trim as shown makes a clean cut design. Both these pictures show the top to some extent. Wood bows natural finish and nickeled slat irons are used on nearly all tops. The fabric used is light in color and European custom has been followed on this part of the body. Foot rests are generally used as well as robe rails on all open bodies. The windshields on these bodies have stationary lower part and nickeled shields are popular.

Flush doors are the rule on open bodies. The future name for this type of body will be phaeton. The name "touring body" has lost its application as indicating the open body and the standards committee of the Society of Automotive Engineers have decided to adopt what is a more universal name, phaeton.

Roadsters were confined to one. This was exhibited on the main floor on the Richelieu chassis and was a large body for its class and had a seat outside the body on the right side and the step for entrance had an extra pad that provided foot room for the occupant. Cycle guards and steps were used.

AN engine bearing with large radiating flanges to help carry off the frictional heat has been placed on the market by the Bearing Engineering Syndicate. The bearings are similar in shape to regular bearings, but are provided with radiating flanges at both ends, which extend parallel with the crank arms. While the ordinary bearing is supported by the metal of the crankcase wall or its partitions, oil is likely to get into the joints and prevent the ready conduction of heat. It is claimed that as a result of the better heat radiating facilities the Radiated Bearing will last longer than an ordinary bearing.

Engineering Features of Salon

By P. M. Heldt

FROM a technical standpoint we never look for very much at the Automobile Salon that is entirely new. Coming as it does directly after the great foreign shows, whatever there is of recent development among the foreign chassis has been exhibited at one or the other of these shows and has been covered by reports on them by our foreign correspondents. Leading American car makers, even though they may exhibit at the Salon, would hardly select that exhibition of comparatively narrow appeal to present any radically new designs. Novelties would be expected only from those manufacturers who cater chiefly to that select clientèle for whose benefit the Salon is held.

The one car to make its first appearance at the Salon was the Richelieu, a new assembled product from Asbury Park, N. J. It is typical of a class of car of which there are already several on the American market, having a powerful four-cylinder engine, a sporty type of body and high-class equipment. The engine is a Rochester Duesenberg four-cylinder 4¼ by 6 in., 85 hp. Other parts and equipment include a Brown-Lipe clutch and transmission, Standard Parts front and rear axles, a Gemmer steering gear, Bosch magneto, Westinghouse electric equipment, Hartford shock absorbers, Romon lubricator, Fleetwood body and Houck wheels. The car has a 130-in. wheelbase and is made for the present in three and four-passenger open types.

Unit Power Plants on Foreign Chassis

Looking over the foreign chassis at the Salon one is impressed with the fact—pointed out at once by our foreign correspondents—that European design tends strongly in the direction of rear axles with torque tubes, with either a forked or spherical connection to the transmission case at the forward end. The spherical connection apparently is much more prevalent than the other. At the same time Continental manufacturers have gone in quite strongly for unit power plant construction with three-point support. As many of them are using four-speed gearsets which overhang the engine supports on the flywheel bell housing a considerable distance, which supports are generally more or less hidden by the dashboard, and as the torque tube extends directly from the rear end of the overhanging transmission without any support from the frame at that point, this gives a chassis of unusual though very clean-cut appearance.

There are two eight cylinder-in-line engines at the Salon, the Duesenberg, which was fully described in a recent issue of AUTOMOTIVE INDUSTRIES, and the Isotta Fraschini. Both of these are chassis of exceedingly trim lines. The Isotta has a wheelbase of 146 in., which is probably the longest wheelbase passenger car that has ever been built. This car has a lock on the transmission. There are three finger levers on the steering wheel, for the spark advance, the throttle and the mixture adjustment respectively. All three are of the same design and are spaced evenly in a circle, but their uses are plainly marked on them. Many features are notable on this chassis that are adopted in the interest of clean chassis lines, for which Italian cars are so noted. Thus the timing shaft for the ignition distributor passes through the crankcase from one side of the engine to the other. The high tension ignition cables from the distributor do not extend directly to the spark plugs, but pass through an inclosed space at the side of the engine, so that the visible portions are comparatively short. The front springs are held to the axle by pressure plates which have four threaded studs forged integral with them. The rear underslung semi-elliptic springs are held to loose collars on the axle housing by U-bolts or saddle bolts for which saddles are forged on the collar, one in front and one in the rear of the axle housing. This is contrary to the usual practice where saddle bolts are used, where they are made to straddle the axle housing itself.

Two Carbureters on Multi-Cylinder Engines

A new six-cylinder model of Benz car is shown. In this, as in the Isotta eight-in-line, there are two carbureters. The cylinders of the Benz six are cast in two blocks and each block has its carbureter bolted directly to it, on the side opposite from the inlet valves, the inlet passage extending through the cylinder block. There is a tire pump on the cam gear housing. The Robert Bosch electric system is fitted to this car. In this the starter motor is engaged with the flywheel gear ring by means of a sliding armature under the influence of the magnetic pull of the field frame, relative to which the armature is axially displaced by a spring. This is the system originally developed by Rushmore, whose plant and business was bought by Bosch about eight years ago. In order to avoid possible injury to the flywheel gear ring from the clashing action of the gears, the starter pinion is made of hard bronze and of comparatively small dimensions, so that its teeth are weaker than those of the driven gear and would break first in case of abnormal stress. This pinion is a cheap part and can be quickly replaced.

On the Benz the transmission, which is a four-speed unit, is mounted amidships, between two cross members of the frame. The cross shaft of the brake linkage with the equalizing mechanism is inclosed in the gear box, which tends to make the chassis layout cleaner. There is also a neat feature on the circulation pump. The inlet and outlet to the pump are in the form of a single casting of T shape, mainly above the pump proper. To the horizontal sections of the T the hose connections to the radiator and jacket are secured, bringing these two connections in line and making it appear as though the water passed from the radiator directly to the engine jacket. The Vee fronted radiator has led to the adoption of a rather peculiar-shaped fan. This fan is quite small, the large size of the radiator making much assistance from the fan unnecessary. It would seem that in the design of this Benz an attempt had been made to meet somewhat contrary requirements, namely, large size of car and economy in fuel consumption and upkeep, for the engine is very small in comparison with the space provided in which to lodge it.

Since the cars at the Salon are representative of the high grade product of the automobile industry, it is interesting to note the type of wheels on the models exhibited. Wood wheels are in the lead, but wire wheels follow closely, while the disk and pressed steel spoked types are used on a few models only. A rather remarkable feature is the strong representation of wire wheels, these being fitted on the following makes of cars: Benz, Isotta, Minerva, Hispano, Rolls-Royce, Cunningham, Winton, Lanchester, Daniels, Baker electric, Duesenberg, Rochambeau and Richelieu. Some exhibitors, like Winton and Daniels, show models with two or three different types of wheels.

Marketing the Motorcycle

Part II

Some phases of motorcycle selling are common throughout the industry. Others are individual to specific companies. The general phases are discussed in this second article. A broad vision of marketing, proper dealer organizations and co-operative research are among the topics treated.

By Norman G. Shidle

METHODS have been discussed regarding the determining of the potential fields for motorcycles in a given territory. When this has been done as accurately as possible, in view of the statistical and economic data available, the problem remains of actually selling machines to the largest possible number of those who comprise that possible market. Under present conditions it may as well be admitted that this possible market is not identical with the immediate probable market. Moreover, the total immediate probable market as a whole is not the immediate probable market for every individual motorcycle manufacturer.

The problem of the individual manufacturer, then, is to determine what part of that entire market constitutes a possible market for his type of machine and the proportion of that section of the entire market which he can hope to sell. It is scarcely sensible for any single manufacturer to expect to sell 100 per cent of the possible market in his class and to build up his production and sales organization accordingly. These detailed factors can be determined only by a study of individual production and sales statistics, however, and are not included in the field of these articles.

THERE is enough progressive and constructive thought within the motorcycle industry to make the motorcycle a real factor in personal transportation in the United States. There is a necessity, however, for viewing the marketing problem in perspective. All the factors must be considered in their proper proportion. Tradition should not be allowed to obscure relative values.

There are certain general factors in regard to selling, however, which would appear to apply throughout the motorcycle field. Some of these have been discussed before, but they are so fundamental as to warrant repetition in considering the general problems of marketing the motorcycle.

The chief factors in motorcycle merchandising at present, perhaps, are as follows:

1. The dealer organization
2. The relationships of local rival dealers
3. The relationships of rival manufacturers
4. The human and psychological factors of the market
5. Relation of temporary actions to permanent progress

At the recent motorcycle show in Chicago motorcycle manufacturers are reported as showing more interest in dealers and prospective dealers than ever before. During the last few years, when demand exceeded supply, only large city dealers were supplied. Small town dealers were entirely neglected, with the natural result that these small town dealers are not responding very enthusiastically when called upon at the present time.

Manufacturers in general are apparently convinced of the ill effect of the current misuse of the motorcycle and, in establishing new dealer contacts, this factor is being considered. A definite effort will probably be made to establish the motorcycle socially.

The one new vehicle exhibited at the show is interesting from this marketing as well as from a mechanical point of view. Reports indicate that this new automobile-built motorcycle is to be sold on a basis definitely different from that of other motorcycles. It is to be sold as a utility transportation vehicle. Its speed is limited to 35 miles per hour. The following statement, made by the publicity agents for this vehicle, is also of interest: "There have already been enough inquiries from automobile dealers to indicate that the logical sales outlet is through the automobile dealer."

This will be an interesting experiment. Some other motorcycle companies, as a matter of fact, are reported to be signing contracts with automobile dealers in small towns. They believe that it is likely their equipment will have to be sold from the transportation shop in the small town. All these developments indicate the vital dealer problems which are properly concerning the motorcycle manufacturers at present.

The dealer is the contact point with the public, and he is largely instrumental in molding public opinion of the motorcycle, regardless of publicity efforts of the manufacturer direct to the buyer. Thus the dealer organization assumes a peculiar importance in the motorcycle marketing scheme.

In another sense the dealer organization must be carefully considered from the standpoint of the individual manufacturer. There is a distinct difference in the potential market of the big power motorcycle and the middle-weight and light-weight machines. A manufacturer may be better off temporarily without any distribution in a given territory than to have his product in the hands of a dealer not thoroughly sold on his type of machine.

The type of dealer is important, therefore, from the standpoint of the selling appeal of the particular vehicle. The large majority of dealers in the motorcycle business to-day are thoroughly sold on the high-powered, speedy

motorcycle. This group comprises those dealers who have been in the business for many years, who know all the race riders by their first names, who follow racing records closely, who like the thrills of high-speed driving themselves, and who are capable of selling this type of vehicle to the limited group with similar interests.

In this group of dealers are some high-grade business men, who have visualized the utility possibilities of these big machines and who see the possibility of an expanding market through a promotion of the less dangerous and more enjoyable sporting phases of the motorcycle. This section of the high-powered dealer group is not in the majority at present. The type of man is readily recognized, however, and he is probably capable of developing the field of this type of vehicle to its ultimate extent—which is probably a little wider than that known by total motorcycle sales in the past.

In other words, the best type of dealer now in the business should probably be called upon to sell the high-powered machine. The dirty, unintelligent type of dealer should be eliminated from every kind of motorcycle selling. The best type of dealer, just referred to, is capable of selling everyone that the uncleanly, low-grade dealer sells to—and he can sell to many others besides. The low-grade dealer, through his influence and methods, increases sales resistance to motorcycles in general to a greater extent than any other single factor.

One of the metropolitan dealers of a high-powered machine, for instance, has a shop which is so filthy, so dark and so unpleasant in every way that no self-respecting man would venture into it under any circumstances. Fortunately for the manufacturer involved, the methods of display used by this dealer are so bad that it is difficult to determine what business he is in.

It appears, then, that the majority of dealers now in the motorcycle business are those who have sold the high-powered machine for years and who are "sold" on that type of vehicle. Many of this group are definitely the type of men who do the industry more harm than good. The higher type of dealer now in business, however, must be multiplied. He is capable of marketing the high-powered machine efficiently and of giving it the widest distribution possible.

The education of these dealers must, of course, go on. But manufacturers will do well to estimate carefully where the possibilities of such education begin and end in the case of each dealer. Education implies some basis of starting. There are many dealers selling motorcycles to-day who can never be sufficiently educated to make them a profitable investment from the standpoint of ultimate sales expansion. Not only the actual sales of the individual dealer must be considered, but also his effect upon the motorcycle market in general. This is peculiarly true of the motorcycle, as noted before, because of the prejudice against it which exists so widely. The high-type dealer of this group, moreover, who either exists or can be developed, will relegate to its proper limited importance the matter of racing and race records.

The racing deaths of recent months have probably done more to strengthen the prejudice against the motorcycle than many thousands of dollars spent in propaganda work could hope to overcome. The general public is interested in the news items describing the death of riders. It is not at all interested in the technical discussions of racing rules and M. A. T. A. regulations which follow such events.

Motorcycle marketing should be visualized as a whole. The prime purpose of the manufacturers and dealers is to sell more motorcycles. Racing has a small part to play in this broad scheme of progress. In tracing the benefits which apparently accrue from racing, manufacturers should consider as well the vast sales resistance which is caused and strengthened by this same means. If an accurate analysis and balance were possible, it is very doubtful as to which side of the scale would weigh down.

Manufacturers sometimes plead that they would like to curtail racing expenditures and the emphasis which has been placed upon racing, but that they cannot do so because their dealers would not permit it. Dealers of this kind are not maximum motorcycle sellers. The dealer whose view of the merchandising problem is so thwarted by the racing bug that he considers it of major importance, will not develop maximum sales in his territory. It is encouraging to note this statement in a recent issue of a motorcycle paper: "It is in the air that factory-promoted races will end with 1921."

HERE is a statement from within the motorcycle industry:

"We strive to reach a field of dignified, clean-cut riders. To do so we educate them in terms of exalted speed and daredevil exploits of track burners. We bemoan the presence of public disfavor and to remove it we increase the burden by eternally shouting Speed, Speed, and more Speed.

"The almighty dollar is so close to the nose of some that it blocks the view of the great heap of dollars that lie just beyond the narrow field of prospects developed by racing."

The high-type dealer, many of whom are already connected with various manufacturing organizations, would promote other sport events for the big motorcycle which would not only be less dangerous, but would interest more people and which would bring the motorcycle before the public in a favorable light. The details of these phases need not be discussed here, since they are thoroughly understood by men within the motorcycle industry.

The Light Motorcycle

The light motorcycle, however, presents a distinct marketing problem. A majority of the dealers selling motorcycles to-day are thoroughly "sold" on the high-powered type; this is true even of the high-type dealer about whom we have been talking. That there is a definite field for vehicles of this kind and for dealers of this kind is not to be doubted. Past and present sales and statistics prove that. They also prove, however, that there is a definite limit to the number of such machines that can be sold; that these limits are already close enough to be defined in a general way. This does not mean that such motorcycles cannot be profitably made. It does mean, however, that the annual sales curve for this type of vehicle has almost reached the point of permanently straightening out.

Thus if the lighter motorcycles are to attain a numerical development similar to or greater than that already achieved by the big machines, they must sell their product to a different class and type of buyers than those to which the big machine appeals. In other words, so far as the ideals of the present majority class of dealers and buyers is concerned, the big machine is superior to the small machine in every way.

There are other types of buyers, however, with different ideals and different purposes, who may be

sold on the light motorcycle if approached in the right way. This can be accomplished only by a dealer organization which is thoroughly sold on the field and possibilities of the light motorcycle. The usual motorcycle dealer handling a light machine, in addition to a heavy machine, is not likely to do the latter justice.

An example of this occurred recently when a man interested in a light individual transportation vehicle went into a dealer's shop. This dealer handles about twelve different types of motorcycles, ranging all the way from one which will go over 80 miles an hour down to small machines which are little more than bicycles with a motor attachment.

The customer indicated his interest in one of the lighter machines and desired to have his convictions concerning their performance and possibilities strengthened. He was not very strong for motorcycles in general, since he had imbibed much of the popular prejudice; but he was rather interested in a light vehicle, not costing too much, which would take him back and forth from work.

The salesman met this customer's approach by stating that the light machine might do for some people, but said in a rather disparaging tone of voice that it really wasn't much of a machine, anyhow. He indicated that anybody with any red blood in his veins would want one of the big, powerful machines which he himself rode. He then proceeded to relate great speed records which he had made on such a big machine himself, and told much of the power accomplishments, etc.

He finally indicated that he would, of course, be willing to sell one of the lighter machines if anyone insisted upon it. Nevertheless, the customer gathered that this particular salesman, at least, would rather look upon anyone who actually preferred such a machine as something of a "nut" or curiosity.

While perhaps not so marked in every case, this attitude is somewhat typical of the average motorcycle dealer of to-day. The light motorcycle cannot be competently handled by such men, regardless of their business ability, their well-kept salesrooms and their selling achievements.

It would seem that an entirely new dealer personnel might have to be developed; this new group of dealers to sell to an almost new group of buyers. The growth along this line would of necessity be very slow. A new idea and new methods cannot be expected to mature over night. Moreover, the light motorcycle will continue to suffer with the big one the public prejudice which exists against the motorcycle in general, and will thus have additional difficulties to overcome.

Some manufacturers of lighter vehicles, however, already have come to this conclusion and are starting on the road to permanent progress. It is perfectly possible that the road will be longer to increased sales, but once the upward swing is started there would seem to be far greater ultimate possibilities than have thus far developed in the high-powered vehicle market.

Co-operative Action

There are certain problems, however, which the motorcycle industry faces as a whole. These problems must be met co-operatively. A big vision of the possible development of the motorcycle in America must be substituted for all attempts to gain small and temporary advantages. A sincere spirit of co-operation among all manufacturers and a definite effort to face constructively the problems confronting the industry might mean thousands of dollars in the pocket of every individual firm within the next 10 years.

Such co-operation would involve the exchange of intimate information and the development of constructive marketing research. The difficulties of the individual manufacturer at the present time do not really lie in the competition of other manufacturers, but in the overwhelming prejudice existing against all motorcycles, in the limited uses to which the motorcycle has been put in most cases and in the lack of accurate marketing analyses.

In carrying out co-operative efforts all agencies within the industry might do well to examine these more fundamental factors in an attempt to determine some real facts upon which to base progressive development. These things are vital to the industry and are more important than questions as to whether or not anyone should be allowed to participate in an M. A. T. A. run unless he is a registered member. There are fundamental problems facing the motorcycle industry. Most of them are such as call for co-operative, constructive thought and action at the present time.

None outside the industry is capable of solving or even of visualizing these problems completely. It is the task of the men within the industry and can be accomplished only by them. A frank discussion of these problems among the various manufacturers would soon result in a concrete visualization of the actual problems. This would be followed by constructive research and finally by the determination of methods of progressive procedure which would largely benefit all concerned.

Getting Co-operation Across to the Dealers

This idea of honest-to-goodness co-operation must be instilled into the dealers—or dealers should be obtained with a broad enough vision of marketing to push the idea on their own account. It is reported that motorcycle dealer associations in the past have frequently been little more than criticism parties, and that they have frequently broken up on account of the ill feeling generated by the meetings.

The chief necessity facing the motorcycle industry to-day is that of selling the public on the motorcycle as a vehicle. While each manufacturer and dealer, of course, is immediately interested in selling his own machine, the motorcycle in general must be sold first. If this were successfully accomplished there would be increased business for every manufacturer and dealer in the business. Until it is achieved, sales and production will be limited to the old customers.

The dealer who spends his time knocking other motorcycles in an attempt to convince the public of the superiority of his own machine is definitely piling up future sales resistance for himself as well as for other dealers. The dealer who lacks enough constructive vision to cooperate with other dealers sincerely and broad-mindedly in the promotion of the motorcycle idea has no place in the motorcycle selling scheme of the future.

The vision of a broad merchandising policy for the motorcycle as a vehicle is necessary throughout the industry, throughout its publicity, its sales methods and its thought and discussion, within and without its own borders. Thus may real progress be made toward an increased and constantly broadening market.

There is sometimes too great a tendency to concentrate attention upon traditional problems and traditional interests. The matters discussed at meetings have a tendency to rotate about small points of interest to no one not intimately connected with the industry.

Available statistics concerning the motorcycle industry show few encouraging signs, viewed over a period of some 10 or 12 years. There is no steady commercial growth shown by the industry as a whole to parallel the progress in mechanical and engineering phases during the same period. There have been many ups and downs in both domestic and foreign trade; the figures show a series of abnormal conditions, each one of which affects sales.

A close analysis of these trends, made by those thoroughly familiar with all branches of the industry, might reveal the causes underlying the lack of apparent progress. On the basis of such an analysis, intelligent discussion might proceed as to how the difficulties might be remedied.

These things cannot come about, however, until the industry and its important marketing problems are viewed in a big, broad way and from a scientific and analytical point of view. Such studies would include an analysis of the human and psychological factors which affect the buying of motorcycles. This would not simply be the offhand opinion of a group of men, but sincere, detailed study designed to find out as much as possible about these variable factors. Many of these factors are apparent, but little constructive effort has actually been made to meet even the obvious difficulties arising from the psychological state of the general public toward the motorcycle.

Were the intense interest and constructive thought of the various agencies within the industry focused upon these problems great progress would be made within a few years. In one sense the vision of the motorcycle industry as regards its marketing problem appears to be out of focus. The position of the lens needs to be shifted.

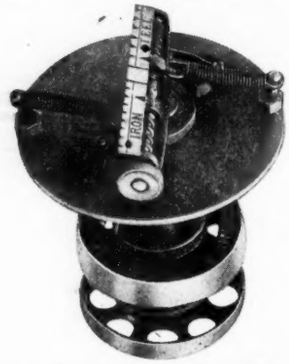
The necessity for immediate sales must, of course, be recognized. It is not always possible to go directly toward an ideal condition. But until some careful analysis reveals the actual possibilities and probable scope of development in some definite fashion, there are few standards by which to direct temporary actions at all. A clear analysis of all the factors affecting motorcycle marketing, an attempt to properly correlate these factors and a concrete visualization of the fundamental problems confronting manufacturers in developing new markets would go far toward giving impetus to future sales.

Magnetically-Controlled Tapping Machine

THE tapping machine illustrated herewith carries the tap in a floating spindle, which is driven by two cushion springs, the object being to eliminate shocks and jars on the tap. The machine embodies an automatic oscillating feature which is controlled electromagnetically. By this oscillating feature hand-tapping is imitated, but the limit of strain placed upon the tap is controlled much more accurately, being fixed by the tension to which the spring is set.

Should the tap hit bottom, a tight hole or any other obstruction which places a greater strain upon it than that for which the dial is set, the machine will reverse automatically, move backward one-sixth of a revolution, thus freeing the tap, and then reverse again. This oscillation continues until the obstruction has been overcome. In ordinary tapping, where the strain on the tap does not exceed the limit for which the machine is set, there is no oscillation. It is claimed for this machine that it will tap one thousand 3/16-in. blind holes in steel per hour with a bottoming tap, ½ in. deep, full thread.

Gaterman electro-magnetic tapping machine



Adjusting device with dial for varying maximum strain on tap

The machine described is manufactured by the W. Gaterman Mfg. Co. It is to be made in radial and other types, and one of its features that will appeal to the owner of a small shop is that it can be quickly converted into a drill press.

OXY-ACETYLENE cutting has met severe competition in recent years from cutting with fuel gases and oxygen. This is believed to have resulted from difficulty in obtaining compressed acetylene during the war and immediately thereafter. According to the Oxy-Acetylene Welding Committee of the International Acetylene Association, the value of acetylene in this connection is being recognized more and more. A new field seems to lie in cutting out intricate shapes for parts for experimental machines. It is reported that in one case connecting rods were cut out by the oxy-acetylene torch. Forgings are being trimmed practically to finished size by this method.

Industrial Standardization in Germany

Great Britain alone is carrying on this important work to an extent as great as Germany. A remarkable work has been accomplished in four years, or since the establishment of a central standardization body.

INSUFFICIENT attention has been given to the role which standardization is playing in German industrial reconstruction. The German industries are planning and are carrying out a far-reaching program of standardization as a necessary step in building up an unprecedented industrial structure which must rest in large measure on an extensive foreign trade. In no other country except Great Britain is standardization work being carried on upon a scale or with an intensity comparable to that in Germany.

The German work is of special interest to those responsible for the management of American industries, not only because of its importance, but also because of the similarity in the historical conditions surrounding the national standardization movements in Germany and in America.

Prior to 1917 a vast amount of standardization work had been carried out in Germany by individual companies and by engineering societies and industrial associations, but as was the case in America before the organization of the American Engineering Standards Committee, the work had not been unified along national lines.

As has been the case with all the other national standardizing bodies, except the British, which was organized in 1901, the success of the standardization work carried out by the various countries during the World War as a part of their national conservation programs was a chief cause of the formation of the central German body. It is called the Normenausschuss der Deutschen Industrie, and was organized by the Verein Deutscher Ingenieure at the suggestion of the German Government in 1917. The present membership consists of engineering societies, industrial associations and government ministries, and, in addition, there are 700 firms who are contributing members. The work of the Normenausschuss deals only with those subjects which concern two or more industries or branches of industry.

Work Accomplished in Germany

It is remarkable that the national standardization movement in Germany should have been so thoroughly organized and that so much work should have been accomplished in four years. One hundred and forty-four approved standards sheets have been issued and over 500 others have been so far developed that they have been published in tentative form. The standards are issued under the general designation of German Industrial Standards (Deutsche Industrie Normen, usually contracted to the slogan "Dinorm"). The Germans were the first of the national bodies to publish standards in loose-leaf form. The work is so divided as to make each sheet as nearly independent as possible. Firms purchase these sheets in quantity, issuing them directly to designers, draftsmen and foremen for use as working drawings and data sheets. (This plan is now followed by the Austrian, Dutch, Swedish and Swiss bodies.) The sale of sheets amounts to about 100,000 monthly.

Looked at broadly and with exceptions such as must always be made in general statements of the kind, the continental countries are going much further into dimensional standardization than has been done in Anglo-Saxon countries. This includes interchangeability of supplies and of machine elements, the interworking of parts and of related apparatus made by different makers, and the interchangeability, so far as the use is concerned, of complete machines and apparatus. By far the greater part of the work of the Normenausschuss is dimensional, greater attention being paid to such matters as machine elements, screw-threads, bolts and nuts, standard diameters and systems of limit gaging. The Anglo-Saxon mind takes more to matters having to do with purchase and contract, such as specifications for materials and for performance of apparatus, methods of test, etc. The Normenausschuss itself has done very little of this type of work as yet, but it has been highly developed by some of the German special industry committees, for example, in the electrical industry. Some of these special industry committees are very active in the elimination of types, sizes and grades of manufactured products.

Yielding Commercial Advantages

German manufacturers will go further in yielding apparent temporary commercial advantages for the sake of advancing their national industry as a whole than is the case in America or Great Britain. Three principal reasons for this are: The great economic pressure under which German industry is laboring; the mental trait of more readily acquiescing in decisions affecting national welfare, and the belief that an essential to the rehabilitation of German industry is the rebuilding and great enlargement of their export trade, for which the importance of standardization on national lines is more readily apparent than it is in domestic trade.

The Germans have not yet had their standards translated into foreign languages for use in export, as the British are doing, but they are now giving consideration to this question.

The standardization movement in Germany is particularly significant, since Germany is one of the three leading industrial countries. The industries of Austria, Holland, Sweden and Switzerland are so intimately related to those of Germany on account of geographical and other relationships that they are necessarily affected very largely by developments in Germany. Hence the work is bound to extend to these countries.

It appears that the work is being woven very intimately into the industrial fabric. The very large number of standards purchased by the industry and the fact that the central organization has 5000 firms which are co-operating members are sufficient indication of this.

There seems to be a striking analogy between the present standardization movement in Germany and the research movement developed there a generation ago. Whatever estimate one may place upon the role it played in German industries generally, everyone agrees that research was fundamental in the development of their great chemical industries.

Co-operation Urged at Meeting of Fuel Men with S. A. E.

Technical sessions of the annual meeting of American Petroleum Institute devoted to automotive fuel problems which were discussed both from the standpoint of the refiner and the automotive engineer. Automobile men urge better quality of gasoline to cut down operating costs. Cheaper fuel will be difficult to obtain in the opinion of men from the oil industry.

CHICAGO, Dec. 8.

CLOSER co-operation between the petroleum and automotive industries in order to secure the maximum of fuel efficiency was the keynote of the annual meeting of the American Petroleum Institute which has just concluded here. The convention was well attended by both automotive engineers and oil men. The registration was about 500. Speakers from both industries emphasized the need for such co-operation and the duty to the public that is owed by both the fuel men and the automotive engineers.

Results of this co-operation, it was emphasized at the meeting, will prove beneficial to both industries for increased fuel efficiency will reduce operating costs and consequently increase the sale of both automobiles and fuel. Cheaper gasoline, it was pointed out by some speakers, is not so essential as a better quality of the fuel. When more miles per gallon can be obtained the car owner will be more willing to pay the price now required.

The technical sessions of the meeting were held as joint sessions with the Society of Automotive Engineers. While the two organizations have co-operated to some extent ever since the Institute was formed, this meeting was the first open gathering in which the mutual problems of the petroleum and automotive industry have been given joint consideration. The engineering branch of the automotive industry was well represented by men who are thoroughly awake to the importance which petroleum has played and will continue to play in the automotive industry.

Two joint technical sessions in which automotive representatives took part were held. One of these sessions was devoted to quantitative and qualitative discussion of the fuel problem. Dr. Van H. Manning, director of research of the American Petroleum Institute, read a paper giving a quantitative survey of the production of motor fuel. He showed that vehicle registration in this country increased 125 per cent from 1909 to 1920, while the production of crude petroleum increased only 101 per cent. In 1911 there were 315 bbl. of crude production for each car, but in 1920 only 48 bbl. of crude per car were produced. He admitted that "one is forced to the conclusion that the decline in production per car is becoming a serious factor," but maintained that there "should be no concern over a future supply of motor fuel." He indicated that at some future date reliance may have to be placed in shale oil as a petroleum substitute, and in imports from foreign sources. He said nothing, however, concerning possible intervening periods of stringency during the time required for the development of these resources.

Figures given by Doctor Manning showed that about 20 per cent of our petroleum requirements last year came from Mexico, but that this importation of crude furnished only about 5 per cent of our motor fuel supply.

H. M. Crane, consulting engineer, in his paper, "Requirements of Motor Vehicle Fuel," said every possible effort should be made by refiners to make the fuel supply more suitable for use in the really only simple form of engine now available. He declared engine simplicity is required if a reasonable degree of economy in the use of fuel is to be expected when handled by unskilled persons.

Mr. Crane also suggested a seasonal and local variation in fuel quality as temperature conditions permit.

Frank A. Howard, manager of the Development Department of the Standard Oil Company of New Jersey, said he recognized the great difference in combustion characteristics of various gasolines, but places emphasis upon the great economic difficulties involved in changing present conditions. Changes, he said, could only be effected by high prices, and these are considered undesirable by all concerned.

A somewhat pessimistic view of future petroleum supplies was taken by Harry F. Sinclair, Chairman of the Board of Directors of the Sinclair Consolidated Oil Corporation. Mr. Sinclair, however, said he expected that there would always be a plentiful supply of petroleum if the public was willing to pay the price. He admitted the situation in the Mexican oil fields is serious and will continue so unless new fields are soon located there. American interests, he declared, should take an active part in the development of other foreign fields if they intended to maintain their present supremacy.

The situation from the standpoint of the automotive manufacturer was taken up by Edward S. Jordan, president of the Jordan Motor Car Company. He declared there must be more mutual co-operation between the two industries and said the automotive manufacturers were endeavoring to make more efficient and economical vehicles. The public, however, he said, is demanding a better grade of gasoline. Ten million owners are using automobiles as utilities and their demands are for greater economy. He pointed out that the more barriers to sales that are removed the greater will be the volume of business for both vehicles and fuel.

N. A. C. Smith, petroleum chemist of the Bureau of Mines, presented a brief paper showing how the volatility of fuel sold as gasoline has varied from year to year, as determined by data collected throughout the country by the bureau. By taking the average and point of 10 per cent of the samples, comprising those at the upper end of the scale, and another 10 per cent comprising

those samples at the lower end of the scale, it was shown that the difference between the extremes was 80 deg. Fahr. in July of this year. In some previous years it was over 100 deg. Fahr., indicating that there is, at least, some tendency toward standardization, though the variation between the best and the poorest samples is very considerable. With the exception of a somewhat abnormal peak in July, 1920, it was shown that the average end point for all samples has steadily increased since 1915.

R. E. Wilson of the Massachusetts Institute of Technology presented a paper on "What Constitutes True Volatility," in which he suggested a change in the method of writing fuel specifications involving two specific tests for volatility and a single test for determining the knock-producing tendency.

The paper by C. K. Francis, chief chemist of Cosden & Co., dealt with variations in the quality of motor fuel, their extent and cause. He dwelt upon the desirability of low sulphur content and freedom from acid and mentioned some causes and effects of faulty blending. He spoke of the desirability of building engines more economical in fuel, but said nothing about the possibility of so improving fuel as to facilitate its more efficient utilization.

The first general (non-technical) session of the meeting was opened by an address by Thomas A. O'Donnell, president of the institute. This was followed by an address by Walter C. Teagle, president of the Standard Oil Co. of New Jersey, on the "Current Year in the Petroleum Industry," in which he dealt at length with the economic conditions of the past year and explained the reasons for the rapid decline in price of crude and refined products, which, he said, were in line with declining values of other commodities. He predicted the need for greatly increased production in the future, though the immediate future may not be quite so promising.

The paper by Edward L. Doheney on "The Future of the Oil Business in Mexico" dealt more with the past than with future or present conditions in that country, outlined the methods followed in locating oil there and indicated that similar methods will be successful in the future.

Edward Pizer, president of the Vacuum Oil Co., outlined European conditions and the outlook for improved commerce with European countries, with special relation to petroleum. He believes that the position of the American Government providing that its citizens be given equal opportunities with those of other countries with respect to investments in petroleum resources will be maintained. He said it would not need a great stimulation of oversea industry to drain this country of present accumulated reserves of petroleum. He expects the foreign demand for petroleum products to steadily increase as the world settles down to normal peace conditions.

The papers presented Wednesday, Dec. 7, included one on "Standardization of Oil Country Supplies," by J. R. Stockton, and one on the practical effect of low volatility by O. C. Berry of the Wheeler-Schebler Carbureter Co.

Mr. Berry pointed out various ill effects of too low volatility and said the fuel mixture for highest efficiency is at the lean edge of the explodable range, and any range below the efficient point would tend to stall the engine. The range upward, he said, was very great. He pointed out that lack of knowledge as to proper carbureter adjustment was causing a loss of about one billion gallons of fuel annually. He also urged the refiners to keep in close touch with progress made by automotive engineers to the end that no further reduction be made in the volatility of fuel until the automotive industry is prepared to take care of it.

The paper by F. C. Mock of the Stromberg Motor Devices Co. outlined some of the limitations and difficulties imposed upon engine operation by variations in the volatility of fuel. He likened the manifold to a fuel still in which the fuel admitted is under ready control, while the degree of vaporization is not easily controlled. He indicated that it would be undesirable to hold all fuel to a recognized standard with the provision that fuel which does not conform to the standard should have the nature and extent of the variation clearly indicated.

Following the presentation of these papers there was a general discussion of the value of research to the petroleum industry.

R. L. Welch, general secretary of the American Petroleum Institute, presented an interesting paper showing that the price of products of the petroleum industry is responsive to the law of supply and demand, as with other commodities, in spite of some popular ideas to the contrary.

Harry L. Horning also spoke on the "Automotive Industry and Oil."

In his address at the annual dinner, which was the concluding event of the meeting, J. C. Donnell, president of the Ohio Oil Co., said that the present daily rate of petroleum production involves the draining of oil from over 135,000 acres a year, so that to maintain this rate a similar acreage must be developed next year. This, he said, will cost, including the cost of acquisition, royalty, drilling, lifting and wildcatting, nearly one billion dollars. The outlook for the coming year, he stated, is fairly bright, but is, of course, largely dependent upon development of the acreage mentioned.

Industrial Libraries

MORE than 200 special libraries directly concerned with collecting books and data concerning manufacturing and industrial subjects have been established in the United States. This fact was uncovered by the Special Libraries Association, which is a branch of the American Library Association. The former organization has compiled a Special Libraries Directory, which deals with practically all industries, and gives the location and scope of each library in that industry.

The special libraries listed under the heading, "Automotive Industry," include the following:

Class Journal Company, 239 West Thirty-ninth Street, New York.

Cleveland Tractor Company, Cleveland.

Combustion News Service, 43 Broad Street, New York.

Franklin Manufacturing Company, Syracuse, N. Y.

General Motors Acceptance Corporation, 1737 Broadway, New York.

General Motors Corporation, Hyatt Bearings Division, Newark, N. J.

Packard Motor Car Company, Detroit.

A directory of these libraries will prove valuable in that persons seeking information concerning the industry, who are outside the companies maintaining the libraries, can usually be accommodated by the librarians in charge.

Aluminum from the Engineer's Viewpoint

Editor, AUTOMOTIVE INDUSTRIES:

Dr. Rosenhain's recent article* is a forcible illustration of the metallurgist rushing in where the engineer fears to tread. This is apparently becoming a fashionable pursuit among metallurgists, and one which may be fraught with very evil consequences owing to the natural inclination of the metallurgist to interpret engineering problems in terms of test pieces. It must never be forgotten that some of the finest real engineering the world has ever seen was accomplished before the metallurgist was ever heard of. Even now, is there any metallurgist who can give the engineer any real idea of what test should be applied to any material to determine its suitability for a given purpose and bet money on the result without resource to extensive experiment?

If Dr. Rosenhain would help the automobile designer to use aluminum he can do so much more effectively by correlating its capacity as compared with ferrous metal to resist surface pressure as when a nut and washer are pulled hard down, its capacity to resist wear when rubbing against cast iron, steel, brass or itself; its capacity for stress distribution in the neighborhood of fillets and drilled holes, etc. This latter brings to mind that probably the most useful work ever done from the designer's point of view is that of Professor Cokers' optical determination of stress distribution. Of what avail is it to conduct expensive and often misleading experiments on ultimate strength and impact tests when the only information given relates to that which occurs after failure has commenced? The engineer wants to know what happens before failure commences, or rather precisely where it commences in the stress strain diagram. In a word, he wants some clear idea of the stress hysteresis effect to enable him to advance from his present practice of determining the static load to which a piece may be subjected, doubling it to allow for shocks and then using a factor of safety from 5 to 10.

While no one is more enthusiastic than the writer over the possibilities of wrought aluminum, he must take exception to the tone of Dr. Rosenhain's article in respect to the reliability of aluminum castings. Some twenty years of intensive experience have revealed far more troubles and mysterious failures arising from the use of forgings than of castings.

The automobile piston, as is well known, has always been in the process of being lightened. A decade ago steel pistons were the "gout," and there are few designers who cannot bear witness to the agonies these produced through sheer mechanical unreliability. Wrist pin bosses pulled out by the roots, cracks started through lightening holes and piston heads collapsed. If any further adverse testimony is required to this use of steel forgings the unfortunate man in the machine shop who had to make them will readily contribute his quota. Granted that all this was due to bad design, the fact remains that the weight reduction compared to cast iron was relatively small and that the cast iron piston, with its maximum tensile stress of 20,000 lb. or so, its complete absence of elongation or reduction of area, its utter incapacity to look an Izod testing machine in the face, did its job and did it well.

It is a matter for speculation as to whether the most prophetic metallurgist faced with the query as to the suitability of aluminum cast or forged for a piston in an automobile engine of, say, 4 in. more running at 3000 r.p.m. would say that a cast aluminum disk 3/16 in. thick would stand a pressure of some 400 lb. per sq. in. applied 25 times per second. Yet it does it and the cast aluminum piston is used in thousands of cars. If forged aluminum can give us a reduced coefficient of expansion, if by its use we could save even 10 per cent of weight for the same performance there might be something in it, but to suggest to an automotive engineering world already overburdened with difficulties that it should jettison a part on account of suggested advantages in respect of soundness and reliability for which an extended use has shown no demand is a needless addition to the burdens of life. If Dr. Rosenhain can tell us which alloys show the greatest resistance to wear under cylinder working conditions then will his information be gladly received.

Incidentally he would be advised to go easy on the question of removing the ribs from under the piston head. There seems to be a prevalent idea that a piston has only to be made of aluminum for all heat transmission problems to vanish. This is emphatically not the case, particularly with the modern type of a piston with a separated head.

The case for the forged aluminum connecting rod could well have been presented in more detail. Its advantages in respect of reduction of inertia pressure on big end bearings only need an elementary investigation to indicate how far reaching are the consequences of this particular application in respect of reduction in overall weight through shortening crankshaft and crankpin bearings.

The argument for the casting as applied to frame construction is that any frame of wrought material either steel or aluminum has weak spots where one part is fastened to another, to say nothing of a stress distribution throughout the length of the frame which renders the application of any rolled section, or for that matter pressed section, uneconomical. The only difference is that in the rolled section frame the waste material is carried about as a permanent burden, while with the pressed frame the surplus is left at the frame makers.

The charm of the cast aluminum frame is that the metal can be put where it is wanted, there are no riveted on brackets and it can be built up very simply in sections.

If anyone doubts the virtues of a frame which eliminates riveted on springs, horns, etc., let him make a casual inspection of the first dozen cars on the street which look over two years old and as if they had seen hard work.

*Use of Wrought Aluminum Alloys in Automobile Construction. See AUTOMOTIVE INDUSTRIES for Nov. 3, 1921.

In connection with springs Dr. Rosenhain makes some startling suggestions and the writer would ask his comments on the following:

1. That the suitability of a material for spring purposes is a function of its resilience.

2. That for springs subject to bending the resilience is equal to $\frac{f^2}{2E}$, where f is the maximum stress the material will stand without taking a permanent set, and E is Young's Modulus of Elasticity.

3. That in the case of a good carbon steel spring of $f = 190{,}000$

$$\frac{f^2}{2E} = \frac{190{,}000^2}{36{,}000{,}000 \times 2} = 501 \text{ in lb. per cu. in.}$$

4. That in the case of wrought aluminum the stress at which permanent set takes place probably does not exceed 58,000 lb. even with 88,000 ultimate so that

$$\frac{f^2}{2E} = \frac{58{,}000^2}{10{,}000{,}000 \times 2} = 170 \text{ in. lb. per cu. in.}$$

5. Since the relative densities of steel and aluminum are as 2.8 : 1, the resiliency of aluminum for the same weight, as in the case of steel, becomes 450, which, although exceedingly good, does not suggest the substitution of aluminum for steel as a spring material.

At no time in its history has there been more opportunity for the extension of the use of aluminum than now, but there is no sense in starting with misconception if it can be avoided. It is particularly the field of the metallurgist to develop the alloys of aluminum and to give to the engineer a clear idea of the properties of these alloys *in terms* of the materials he is already using and with which experience has made him familiar.

Few people are so qualified to do this as Dr. Rosenhain, and it is to be hoped that in future he will write along these lines instead of suggesting the laborious machining of pistons from a drawn forging for which any production engineer would cheerfully specify him being taken out and shot at dawn. FORALUM.

Fuel Saving with Brakes

Editor, AUTOMOTIVE INDUSTRIES:

Your editorial of Nov. 17 certainly makes clear the necessity for better fuel economy and it is a question which should be solved without any more delay.

Any one who has taken part in fuel economy tests realizes that there are some points to be considered besides efficient engines. These are points which do not hinge on the future development of proper engine cycles so should be given more attention.

The curves on page 971 of AUTOMOTIVE INDUSTRIES show the comparative tractive resistances of a Franklin touring car and a Ford sedan. The values at a speed of 17.5 miles per hour are 31 and 65 pounds per ton respectively. There is not enough difference in the weights of the two cars to affect the results materially.

These tests were made on smooth pavements so the different forms of suspension probably make little difference. It is natural to presume that the difference must be accounted for by the types of transmissions used, by the types of bearings and tires and the condition of the brakes.

The writer has encountered pressed steel brake drums which were so badly out of true it was not possible to properly adjust the brakes. Rear wheel bearings which wear and cannot be adjusted are unable to hold the brake drums central with brake shoes. The ideal brake should not show any signs of heating unless it is used to slow up the car.

Considerable fuel can be saved if better stream lines are applied to body design, not because we insist on driving at 60 miles per hour but because we frequently drive 30 miles per hour against a 30 mile per hour wind.

R. M. GASTON.

French Truck and Tractor Trials for Military Service

RENAULT, Berliet, Dewald, Pavesi, and Blum-Latil will be the competitors in the French military truck and tractor trials to be held in the neighborhood of Paris during the month of December. Three types of machines are provided for in the competition: 7½-ton trucks, 15 and 20-ton four-wheel-drive tractors, and heavy and light agricultural tractors, which must be either four-wheel-drive or creeper-band type.

This competition will determine the types of trucks and tractors which, while being sold to the public for commercial use, will have the benefit of a military subsidy and will be at the disposal of the military authorities in case of mobilization. Whereas before the war a normal type of 3½-ton truck was subsidized by the State and was used for the great mass of military transportation during the war, the military authorities now require only 7½-ton trucks. There is now no necessity to continue the subsidies for the 3½-ton truck, for thousands of these are in use and can be seized by the military authorities in case of war. The 7½-ton truck is very little used commercially, and in consequence its development has to be encouraged by military subsidies.

The four-wheel-drive tractors are almost exclusively military jobs, their commercial use being limited to forest and quarry work. The first rules to be published were of such a drastic nature that no ordinary tractors could be found to fit them, and in consequence changes had to be made to let in more normal types. Even in their revised form there are very few agricultural tractors in regular construction capable of being entered for the French military trials. Machines of foreign construction are all eliminated, and the requirement of four-wheel-drive or creeper bands further reduces the possible competitors.

New Classification of Tractors for Export

TRACTORS for export, after January 1, 1922, will be classified into four different groups so as to conform more closely to the requirements of manufacturers and exporters of the machines. The classification will be as follows:

1. Wheel tractors.
2. Track laying tractors.
3. Steam tractors.
4. Garden tractors.

The present classification, which has been in effect since April 1, 1921, does not differentiate between the different types of tractors, but merely includes "tractors" and "parts of."

The new classification has been worked out with the aid of the Statistical Division of the Bureau of Foreign and Domestic Commerce in accordance with suggestions from the industry. Its use should increase the value of export statistics of tractors to those interested.

Wage Cost Per Unit Essential Feature of Cost Deflation

The cost of labor per unit of operation is important. The wage scale itself is comparatively unimportant. Reduced waste, increased productivity, and new mechanical improvements lead the way to reduced cost more rapidly than do wage reductions. Fundamentals of question discussed.

By Harry Tipper

THE work of adjustment in the production field in the returning activity of business is proceeding with a good deal of difficulty. This is particularly the case with the adjustment of wages and working conditions to the point desired by the manufacturer and to the point insisted upon by the bankers and other economists.

During the last week an injunction was granted against an association of manufacturers in the New York clothing trade in what is understood to be the first case of the kind brought to the attention of the courts. The particulars are not especially interesting to other industries, but the general fact is suggestive in its indication of tendencies. The manufacturers and unions had an agreement in this trade concerning the wages, hours of labor, etc., which agreement had some months to run. A month or so ago the manufacturers gave the unions notice that they expected to revert to piecework and the unions gave notice of a strike. The unions asked for an injunction restraining the manufacturers from taking any action which would not be in accordance with the agreement already entered into, and an injunction has been granted on these premises in one of the New York courts.

At various times in these articles we have pointed out that the unions were not the only ones to break an agreement. Instances have been recorded illustrating the difficulty existing in employers' associations of securing the maintenance of agreements made with unions or with employees as the economic conditions changed. In fact, the whole history of strikes between labor unions and employers' associations is a record of broken agreements on both sides.

A great deal of publicity has been given to the breaking of agreements by labor unions, but very little has been said about the breaking of agreements by manufacturers, and this is the first occasion of which we have any record when the workers' organizations have taken legal action to enforce an agreement which the manufacturers were determined to abrogate.

A Departure in Union Procedure

A somewhat similar principle was involved in the action taken by the coal miners' unions when the operators gave notice that they would discontinue the practice of taking the union dues out of the wages, as required by their agreement with the coal miners' unions.

Neither of these matters have been finally adjudicated, but they represent a departure in the procedure of the unions. In the past these bodies have been inclined to rely entirely upon their own power in calling attention to the difficulties or in insisting upon the fulfilment of their agreements or desires. They have not been inclined to favor legal action or to apply to the courts for restraining injunctions in any dispute.

Where a formal agreement is made with organizations representing the workers, there is, of course, a binding character to the agreement which may become the basis of legal action at any time, and these appeals to the courts are interesting as indicating what may happen in the future under similar circumstances if the unions find it of advantage to pursue this method.

Wages, Prices and Wealth

The general discussion upon labor questions still turns upon the matter of wage deflation, as it is called. Apparently no attention has been paid to the relation between wages, prices and the accumulation of wealth, so that it is presumed that the reductions of wages will automatically bring prosperity and that it is one of the principal difficulties in the way of returning prosperity. Practically no attention has been paid to the fact that the growth of wealth is due to the increasing surplus between the productive power and the amount required for current expenses, this surplus being stored up in convenient form either in product or productive facilities, nor to the fact that this wealth as a basis for credit permits a larger development for increased future efficiency.

The reduction of factory wages does not bring a proportionate reduction in the price which the user must pay for the commodities, so that the wage-earner whose wages have been reduced finds that his expenses are not proportionately less on account of the reduction.

Because of the uneven character of the adjustment taking place at present and the difficulties of securing a balance there will be a tendency for wages to reduce for some time yet, but the problem will not be settled by these means, because the increased consumption of product permitting the increased production of product is required to restore and increase the actual wealth above the national obligations.

The study of wages must be based upon the study of wage costs and the possibility of decreasing the wage costs without proportionately decreasing the wage rates.

The whole growth of the mechanical system of industry and the concomitant increase in wealth have been due to the ability of the producer and fabricator to

increase the productivity of the worker so that the wage cost per unit of product was reduced without decreasing the wage scale.

As a matter of fact, the wage scale for fifty years increased constantly, despite the temporary fluctuations at moments of depression.

It is somewhat astonishing to find discussions of bankers and other economists limited to the reduction of wages as though the efficiency had reached the maximum and it was no longer possible to increase the productivity of the individual worker, and consequently reduce the labor cost without having to reduce the scale.

The evidence in manufacturing is all to the contrary. Builders of mechanical equipment for manufacturing processes claim that it is possible to build a factory in almost any line of mechanical fabrication which would be notably more efficient than any of the present factories in the character and productivity of its mechanical equipment. Industrial engineers have been able to increase by large percentages the productivity of a plant by the introduction of better systems, and able executives in a number of instances have secured increased productivity by their ability to restore the incentive, increase the loyalty and develop the initiative of their working forces.

The waste committees of the American Engineering Council have made considered statements after their investigations which show a tremendous amount of avoidable waste adding its cost to industry in all directions.

These things indicate that the efficiency is far from the observable maximum, and our observable maximum will probably represent a minimum for future managers of industry.

It is unfortunate, therefore, that so much time should be spent upon the constant discussion of the reduction of wage scales and so little time spent on the question of efficiency and increasing the productivity of the worker.

The banker dealing with credit, finance, standards of reserve and other fixed items by which we measure our industrial actions is inclined to forget the dynamic character of industry and to regard the state of industry almost as he regards his own fixed standards of consideration. Gold is a standard by which we measure other values, and consequently it itself must be regarded as fixed in order that the calculations may proceed. In his considerations of industry the banker is inclined to regard the productivity of labor as more or less fixed, the efficiency of industry more or less at a given point, and the cost of the industry influenced almost entirely by the rates of time costs operating in connection with it.

This method of examination is entirely illogical and has nothing to recommend it. It is not in accordance with the past history, nor in accordance with our known industrial conditions. The periods of greatest prosperity —that is, the periods when our wealth accumulated most rapidly—have been periods of decreasing costs and increasing wages, because they were periods of increasing efficiency. Gradually it is going to dawn upon us that 1913 or 1914 values may have been normal for that time, but they are an absurd comparison for this time. Values have been entirely rearranged and there is no possibility that they will return to the basis which existed before the war.

Instead of using all kinds of means in the endeavor to go back to 1914, we would be better off if we were considering the increase of efficiency that we must secure in order to balance our operations with the new valuations, and raise our manufacturing development to the plane demanded by the new conditions emanating from the war.

The scale of wages is in itself entirely unimportant. The only important thing to the manufacturer is the cost of labor per unit of operation, and past history shows that the reduction of wastes, the increased productivity and the development of new improvements have been the proper ways of reducing cost, and not wage reduction.

Under the present conditions when industry out of balance is attempting to readjust itself, demands will be met in most cases by the reduction of wages, but this will be entirely temporary in its effects and will not succeed in doing more than alleviate the severity of the adjustment.

New methods must be devised, new equipment discovered and a new appreciation of the waste of human endeavor determined in order for us to meet the obligations imposed on industry by the war and the necessities demanded for future improvement.

Tests of Stellite Tools

SOME notable results of performance tests with stellite (an American cutting alloy) are reported in *Zeitschrift für Metalkunde* for September, 1921. Chemical analysis showed the alloy to consist of 50 per cent cobalt, 18 per cent molybdenum, 19.5 per cent chromium, 9 per cent tungsten and 1.5 per cent carbon. In the house organ of Albert Herbert, Ltd., it is stated that by the use of stellite the cutting speed may be increased from 75 to 150 per cent. These claims were fully borne out by the tests reported in our source. A necessary condition, however, is that the cutter is ground to semi-circular form and that the cutting angle does not exceed 5 deg. All other forms of the tool bit resulted in a materially reduced life. In comparative tests with stellite and tungsten (high speed) steel a cutting speed of 130 ft. per minute was used to start with. The depth of cut was 0.080 in. and the rate of feed 0.01 to 0.032 in. per revolution. After the work had been going on under these conditions for 5 hours, the cutting speed was increased to 180 ft. per minute, the cross-section of the cut being 2 x 0.00122 sq. in. In this case the cutting edge of the stellite was destroyed in about 50 seconds. After the bit was ground anew, a plane shaving of 0.012 in. depth and 0.0048 in. feed per revolution was removed, the cutting speed being 308 ft. per minute. Under these conditions the tool worked well. Only when the cutting speed was increased to 385 ft. per minute was the cutting edge destroyed, this happening after 30 seconds. With high percentage tungsten steel it was absolutely impossible to work under the conditions mentioned. The result of the tests is that with stellite a materially higher cutting speed can be maintained in wet as well as in dry turning than with the best tungsten steels. This is its main advantage. In the case of pieces with little stock to be removed, it is possible, by increasing and even doubling the cutting speed, to save a great deal of time. Stellite is equally advantageous in the machining of hard materials. On the contrary, if a great deal of material is to be removed, so that the width of the shaving is large, the conditions are less favorable for the stellite bit, which on account of its form is less suited to the purpose. It is also not so well adapted for cutting screw threads on steel bars, etc.

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The AUTOMOBILE
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Buy—Build—Work

PART of our business depression has been real; it has been caused by economic factors resulting from the war and could scarcely have been avoided. Part, however, has been psychological, the result of fear. This last part has been unnecessary and has caused unnecessary financial losses and human suffering. It should never have been and can be dispelled readily by a more optimistic view of conditions, by a firm belief in the essential soundness of industry, and by determination to go forward on this basis.

"Buy—Build—Work and create a job for every man." This is one of 24 slogans adopted for a poster campaign inaugurated by the Rotary Clubs of the United States in an effort to overcome the fear psychology which has permeated many business organizations during recent months. The above slogan and the ideals behind the entire campaign should be supported actively by the automotive industry. It should be supported by deeds as well as by words.

Aside from the psychological effect such a slogan may have upon American industry, the actual physical results from the actual practice of the motto will prove beneficial. Psychological causes produce physical effects and if the slogan adopted is carried out to its fullest extent the so-called business depression will rapidly disappear. Buy—Build—Work.

Standards Are Created to Be Used

WE fear that the executives of the automotive industry, taken as a whole, have failed to grasp the importance, not to say the economic necessity, of standardization. If this is not true, how else are we to explain, not only the lack of standardization along many lines, but the failure to make full use of many standards already created?

Many manufacturers, including some of the largest car and parts makers in the industry, adhere rigidly to standardization within their own plants, but utterly fail to appreciate the need for bringing these standards into conformity with the standard practice of other makers. They are, in short, a law unto themselves. Like most people of whom this can be said, they are standing in their own light.

Perhaps one illustration will suffice to make this point clear. A certain manufacturer had long employed a set of his own specifications under which all steel which he required was purchased. These specifications differed an inconsequential amount from the standard S. A. E. steel specifications. He did this in spite of the fact that the steel mills (whether the purchaser knew it or not, we cannot say) charged a little more for them than for steels ordered in accordance with the generally accepted standard. This thing went on for some time, for the steel received was quite satisfactory. But one day it occurred to someone to check the actual analysis of the various steels against the factory specifications. They differed slightly but were found to correspond to S. A. E. specifications. It developed, in fact, that the steels were S. A. E. steels, but the vendor had covered himself against a possible technical rejection by charging a slightly higher price than if the order had specified S. A. E. steels!

This may be considered a good joke on the purchaser, but no one will deny that it was poor business. A full recognition of the value of standards would render impossible such situations.

If a standard has been in existence long enough to receive any very general recognition, a manufacturer will find in nearly every case that a change to the standard will benefit him directly, or indirectly, through benefiting the purchaser of his product.

This last-mentioned phase of the situation, the ultimate benefit of the user, is of great importance and far too often lost sight of. We frequently hear it said that so-and-so is such a large buyer or producer that it does not matter whether he uses a certain standard article or not. He can get a certain special size of bearing, for example, as cheap or perhaps a trifle cheaper than a standard size. At first glance this may seem like a real economy, and if the matter ended there it might be.

But it does not and it cannot end there. Once employed this special size must be stocked by the manufacturers of the bearing, of the axle, let us say, and of the car in which it is used, and by a thousand parts depots and ten thousand repair shops, if they would give prompt service. Now if we multiply these special sizes by twenty or fifty—for if one manufacturer gets a special size others will do likewise—the capital tied up in stocks of special parts alone becomes a serious item. Of course the car user pays the bill in the end, but his dissatisfaction with the manufacturer increases as maintenance expenses increase, and the sale of new products is correspondingly handicapped.

We hold no brief for the unqualified acceptance and use of all so-called standards. Doubtless some of them are outworn, immature or in some way out of step with modern conditions. These can and should be revised. Standards, in the sense used here, are not inflexible things which cannot change with changed conditions. But the bulk of those in existence are good and should be used. On the whole the automotive industry has adopted and used standards to a much greater extent than most other industries, but it still has a long way to go in this direction and must take no backward steps.

The Export Business Picking Up

FROM Detroit comes with increasing frequency the report that such and such a company is building right-hand drive cars that can only be for sale in foreign countries. Washington adds that the shipment of cars, trucks and parts were so large in October that we must go as far back as last January, when old orders long held up were being filled, to find exports of these products appreciably higher. From New York comes the statement of various exporters that the overseas trade progressed through November in as large or larger volume than in October.

Buenos Aires sends a cable announcing that the annual motor show, held during two weeks in November, brought brisk sales and that the trade there is greatly encouraged. The Ford plants in Sao Paulo, Copenhagen and Manchester are operating on schedules appreciably increased—in fact, 100 per cent at Copenhagen and practically so at Manchester with a daily output of some 100 cars and trucks.

Barranquilla advices tell of increasing sales, with dealers turning over in August, September and October numerous cars of various makes. Lima adds that exchange has so bettered that several lines have reduced prices with a consequent stimulation of retail business. An automotive expert returning from Havana declares that the automotive dealers in the island republic are in better shape than most dealers and the monthly export figures show that a surprising volume of business is continuing right through the worst depression Cuba has ever undergone. Mexico is holding her purchases to the high level set in early months, despite the oft-repeated assertion that a let-up is imminent, and Porto Rico reports new buying is necessary to meet the demands for military transportation.

The Far East is buying again. The pound sterling has risen so consistently and is off from par such a slight percentage, not even 20 per cent, that buying in all the English dominions has been stimulated greatly. Even the most pessimistic exporter cannot fail to see Australia definitely on the comeback and South Africa is once again getting into the buying column. One company is shipping cars to Syria and Spain, it is stated, with a rising currency, will revise her prohibitive automobile duties not later than January.

The international political and business situation is clearer to-day than it has been since the war began. Europe is regaining its feet economically and industrially and the recent course of the exchange markets show that this improvement is extending to the realms of finance.

Thus, we find a general condition that can mean but one thing. The foreign markets are again stirring into life and are doing their part in taking up the slack of production, the final 5 or 10 per cent that means the difference between profit and loss. They are beginning to take cars when the home market is slumping off because of winter.

This is the reason for foreign trade and this is the reason American automotive manufacturers cannot longer neglect their export trade. When markets are dull at home, in the winter season, then the foreign sales will bolster up the total and keep up production.

Maintaining Standards and Prestige

A RECENT article in the London *Times* from that paper's correspondent in Colombo, Ceylon, deplores the fact that some American cars that have been shipped to that territory recently are decidedly inferior, as regards workmanship and material, to the older models of the same makes of cars. The dispatch stated, however, that some makes of American cars, notably those in the lower price class, were still selling quite well among people in the cocoanut territory.

American manufacturers cannot well afford to permit their products to lose prestige in the eyes of the natives of foreign countries. Exporting will play a large part in determining the volume of business the automotive manufacturer will do in future years. If American cars manufactured for export do not reach the standard set by the manufacturers themselves then there can be but one logical result: the business will revert to the manufacturers of other nations.

The same dispatch from Colombo furnished the information that a London taxicab company had purchased the interests of a similar concern in Colombo and planned to enlarge the business to the extent of adding new cars and building new garages. It was also stated that there is ample scope for the founding of similar enterprises, for the cities of Galle and Kandy are without taxicab services. The Colombo Tramways Company has also decided to augment their service with bus lines running from the ends of their car tracks to suburbs.

Peace Restored in Willys Councils

Agreement Reached with All Interests

Personal Victory for Willys—Banks Agree to Miniger as Receiver

NEW YORK, Dec. 6.—An amicable agreement for the settlement of the tangled affairs of the Willys Corp., now in receivership, was reached yesterday at a conference which was the climax of a series following the action of the bank creditors in having C. O. Miniger and Frank Kennison of Toledo ousted as receivers for the property in New Jersey. They were the original receivers appointed by Judge Killits in Federal court at Toledo.

Under the plan which has been agreed upon Miniger will remain as receiver in all districts, acting with Colonel Francis G. Caffey of this city. Kennison will be retained as a co-receiver in Ohio and Judge Killits will be asked to approve Caffey for this district.

Interests Amicable to Arrangement

All interests have announced that they will be satisfied with this arrangement and will work together harmoniously to reorganize, refinance and straighten out the affairs of the corporation. All court actions will be withdrawn and it is expected a plan of procedure will be decided upon which will be satisfactory to everyone.

The agreement may be regarded as a victory for John N. Willys, who has contended from the first that he acted only for the best interests of all concerned. When it was agreed to file a receivership petition in Toledo, it was urged by Willys that Miniger be named as one of the receivers and the bank creditors' committee be asked to suggest a man to act with him. The course decided upon yesterday merely carried out his original recommendation.

Receivership Due to Misunderstanding

A statement issued at the close of the conference stated that the receivership was due to a misapprehension. An erroneous report that interests in the East intended to take court action reached other interests in Ohio and the West and they filed their petition with Judge Killits. An identical petition was filed with Judge Knox in the United States District Court here and he appointed Miniger and Kennison as receivers. Similar action was taken in New Jersey.

Incensed at what they characterized the desire of Willys to dominate the receivership, the bank creditors' committee filed petitions in the Federal courts here and in New Jersey for the substitution of receivers other than those appointed upon the petition of the Ohio Savings Bank of Toledo. Judge Knox appointed Caffey, a former United States district attorney, as a co-receiver in the southern district of New York, while Judge Bodine, sitting in Federal Court at Newark, removed both Miniger and Kennison, substituting for them Clifford I. Voorhees, a New Brunswick attorney, and James Kearney, publisher of the Trenton *Times*.

Delaware Motion Postponed

Before the agreement was reached, a bill of complaint was filed in Federal Court at Wilmington, Del., by the Chase National Bank, the Equitable Trust Co., the New York Trust Co. and the Chemical National Bank, all of this city, seeking the appointment of a receiver in that State for all the property and assets of the corporation wherever situated or controlled, on the ground that the corporation was chartered in Delaware. A hearing on this application was to have been given yesterday but it was postponed until Thursday. It has been decided that when the argument is heard the Delaware court will be asked to appoint Miniger and Caffey. The same procedure will be followed in the northern district of New York, so that all interests may co-operate in these districts.

(*Continued on page* 1143)

FIRST COAST TO COAST CAR SHIPMENT IS MADE

NEW YORK, Dec. 6—The first coast to coast trainload shipment of automobiles left here last night. The train carried 150 touring cars from the Long Island City plant of the Durant Motor Car Co. of New York consigned to the Oakland plant of the Durant Motor Car Co. of California.

The train, which was composed of 30 freight cars, will cover 3285 miles. The shipment weighed 350,000 lbs. and the freight charges will aggregate $20,000. The cars will be distributed from the Oakland plant.

"GOODSPEED" TO BE EXHIBITED

CHICAGO, Dec. 5—The new car which is being developed by the Commonwealth Motors Co. under the direction of Leland F. Goodspeed will be exhibited at the New York and Chicago shows. It will be called the Goodspeed.

Newark Court Urges Fullest Cooperation

Willys' Chief Concern Is That Reorganization Shall Not Be Retarded

NEWARK, Dec. 5—After hearing arguments by attorneys representing the interests which objected to the domination by Willys of the receivership, Judge Bodine appointed as substitute for Miniger and Kennison a New Brunswick attorney, Clifford I. Voorhees, who was named by him originally to serve with the other two and James Kerney, publisher of the Trenton *Times*, who has acted as receiver in various other cases.

In announcing his decision Judge Bodine said that "no reason exists why there should not be the fullest co-operation between the Ohio receivers, the New York receivers and the New Jersey receivers."

Elizabeth Plant in Argument

It was contended by counsel for Miniger, Kennison and Willys that inasmuch as the big new plant at Elizabeth never had been in operation, the New Jersey receivers would have no concern except in relation to stocks and bonds. The lawyers asserted that the principal earnings of the corporation came from the Electric Auto-Lite Corp. at Toledo of which Miniger is president and that this should be a determining factor in the receivership. Another source of income is the New Process Gear Corp. at Syracuse and the United States Light & Heat Corp. at Niagara Falls, of which Miniger is also president.

A dramatic story of his defiance of one of the most powerful banking groups in America can be read between the lines in an affidavit signed by Willys filed with Judge Bodine.

Affidavit Explains Situation

"My primary concern in this whole matter," said the affidavit, "is that reorganization shall not be retarded by failure of co-operation between different sets of receivers in the different jurisdictions in which the property is situated, but that on the contrary the receivership appointed in the primary jurisdiction (Toledo) should be made the officers of the court in the ancillary jurisdictions, with the addition, if desired, of a third receiver, selected by the court, as was done in New Jersey by the appointment of Voorhees.

"Although he is an entire stranger to me, his selection is entirely satisfactory to the common stock interests for which I am entitled to speak, and I respectfully urge in the interest of orderly and harmonious admin-

(*Continued on page* 1143)

Prepare Plants for January Output

Falling Production Is Approaching End

Factories Are Not Planning to Close for Inventory Before Christmas

DETROIT, Dec. 3—Production in the Detroit factories, which has been falling somewhat steadily since Nov. 1, will reach its lowest figures this month, with certainty of an early pick-up following the turn of the year. There will be no closing of plants except for inventories at Christmas time and the month will be devoted principally to preparing for production in January.

Practically all of the factories in the district are working on a half-time basis, some with half the usual work force, some three days a week with full force and some working half days only with full force.

Dodge is working a close to normal force on engine assembly, getting ready for quick production in January. It has been on a 400 a day basis since Nov. 10.

Ford finished November with approximately 75,000 cars shipped and will continue into December on the same basis, though the Highland Park plant will be closed for inventory at Christmas and production is expected to be cut previous to this date.

Maxwell with its new models is increasing its production 30 per cent Dec. 1, and will make continued increases. The factory is working full time and is gradually adding men.

Durant plant at Lansing will start production Dec. 20 on a 100 a day basis and will continue at this rate until March 1, when it will be increased.

Cadillac is leading General Motors units in production and is operating on practically a 100 per cent basis.

Oakland is on a basis of 100 cars daily working a full week.

Chevrolet continues to be a steady producer in the light car field and has suffered but slightly from seasonal depression.

Buick and **Oldsmobile** are operating at about half the rate of the third quarter, the former being on a three day week.

Hupp is producing at the rate of 50 cars daily and expects to build 1300 cars in December.

Reo is working half days and is turning out about 100 cars and speed wagons daily.

Earl Motors is operating steadily on about 60 per cent basis.

Hudson-Essex reports continued sales progress and expects to continue operation into December on approximately the November basis.

Columbia, Liberty and **Paige** are making steady shipments and with new dealers and distributors look for gradual improvement.

Studebaker plants in Detroit and South Bend have been down for inventories in the past week but are now resuming, the South Bend plant on Dec. 5 and the Detroit plant the week later. Practically 100 per cent production is looked for on resumption, November shipments approximating 3000.

Wills Ste. Claire has entered upon half time operation for December.

Packard reports continued large shipments in the light six model with steady gains in truck demand.

Saxon is operating strictly on a sales basis and reports the signing of new dealers in many localities.

PROSPERITY CAMPAIGN OPENED IN NEW YORK

NEW YORK, Dec. 5 — The first of 100,000 billboards to be used by Rotary clubs in the United States and Canada in a prosperity campaign was unveiled in Times Square in the presence of 2000 persons after an address by Raymond J. Knoeppel, president of the New York Rotary Club. The billboard, which has been erected in 43rd Street near the intersection of Broadway and Seventh Avenue and which faces north, bears the following message written by President Harding, with a reproduction of his signature:

"The White House,
"Washington.

"The people of Washington and Lincoln are conquering the difficult problems of to-day no less worthily and with the faith and confidence which they bequeathed to us. We are sure to find the ways to restored prosperity and our meed of happiness.

"WARREN G. HARDING."

REED FOUNDRY EXPANDS

KALAMAZOO, MICH., Dec. 5—The Reed Foundry & Machine Co. has awarded a contract for the erection of a machine shop immediately adjoining its steel casting foundry here. Work will be rushed on the initial units and is expected to be completed by Feb. 1. Contracts for the necessary mechanical equipment are being placed. The outlook for business for the Reed company is declared at the factory to be excellent. The production of tractors will be an important feature of the business.

Month Makes Record in Shipment of Cars

First of Year to Show Increase Over the Same Period of 1920

NEW YORK, Dec. 6—The automotive industry has safely passed the bottom of the depression and the worst is over. November was the first month of the year to show an increase in shipments as compared with the same period of 1920. The gain was material, and it is probable each succeeding month, until March at least, will mark an equal or greater gain over the corresponding 30 days of the preceding year.

While there was a seasonal decline as compared with October, the falling off was not as great in proportion as it was in 1920. As December opens, the outlook is more encouraging than it was expected to be a fortnight ago. The volume of sales, chiefly because of the good demand for enclosed cars, will approximate, in dollars, the business for October.

Stability Indicated

The stability of the industry is indicated by the fact that October was the eighth consecutive month to show only a slight variation in the volume of business done by the parts and accessory makers. There was a decline of less than 5 per cent as compared with September, and business has been on much the same basis since the end of February. It can be predicted confidently that the total of sales for November will show little contraction, and it would be no surprise if the December showing was correspondingly good.

Manufacturers in both the parts and vehicle fields, whose financial affairs are on a reasonably solid foundation, can view the future with confidence. The volume of passenger car sales in 1922 will be fully as large as in 1921, and in the truck field they promise to be considerably better. Interest in highway transport, both freight and passenger, is steadily increasing. An interesting trend is found in the fact that both steam and electric railroads are coming into the market with greater frequency for trucks and buses.

(*Continued on page* 1147)

Northern California Sales Continue Gain

Demand Is Reported for Medium and Higher Priced Automobiles

SAN FRANCISCO, Dec. 5—A slow but steady increase in the sales of passenger cars has been manifested throughout northern California during November, even exceeding October, when 4920 passenger cars were sold in that month of 1921, as compared with 4469 in October, 1920, an increase of about 451 cars.

The increase was largest in the medium and high priced cars, rather than a result of greater sale of the lowest-priced automobile. The automobile industry apparently has passed the lowest point of its depression in California and is once more on the up-grade.

San Francisco—county and city being co-lineal in area—recorded for October, 1921, one of the largest months the automotive industry ever has had here, nearly doubling the sales of October, 1920, the actual figures being 1173 cars in October, 1921, and 716 in October, 1920.

All Counties Increase

Alameda County, which contains Oakland, the second city in northern California, reports sales of 706 cars for October, 1921, as compared with 588 sold in October, 1920, an increase of 20 per cent. Some dealers showed increases of 50 per cent for the month; others were not so fortunate, but all showed an appreciable gain for October, 1921, over the same month of 1920. Contra Costa County dealers sold 107 cars in October, 1921, compared with 88 cars in the same month a year ago. Santa Clara County dealers disposed of 288 passenger cars, against 246 in October, 1920.

Fresno and Tulare counties, usually two of the best markets for passenger cars and trucks in the State, showed a falling off, in some unaccountable manner, from their records of October, 1920. In Fresno County, only 374 passenger cars were sold in October, 1921, while 435 were disposed of in the same month one year ago. Tulare took only 204 cars in October this year, as compared with 254 in October, 1920.

Demand for Castings Feels Sharp Revival

MILWAUKEE, Dec. 5—The Chain Belt Co., Milwaukee, which has been operating its gray iron foundry three days a week with reduced forces nearly all of this year, on Dec. 1 returned to a six-day weekly schedule and increased its force to a number equivalent to the largest staff it has ever employed. This is due to a sharp increase in orders for castings from a variety of sources, principally machinery, motor vehicles, etc. The malleable iron foundry is increasing its schedules as well.

The Belt company expects only a fair year in its own productive lines, including concrete mixers, paving outfits and construction equipment, but on the basis of present commercial orders for castings from other manufacturers it believes 1922 is going to be a splendid year. It is wholly unusual to experience a sharp revival in demand for castings at the end of the year and the rush at present is regarded as a good omen, especially since orders specify deliveries as far as three and four months ahead.

Take Appeal from Order Directing New Owen Sale

WILMINGTON, DEL., Dec. 5—An appeal has been filed in the United States District Court here from the court order granted a few days ago directing a new sale of the personal property of the Owen Magnetic Motor Car Corp., near Wilkes-Barre, Pa. The order refused confirmation of the previous sale, at which $136,000 was bid by clients of Nathan Bilder, who presented the appeal.

The contention of the receiver and Reuben Sattethwaite, counsel for the Wyoming National Bank of Wilkes-Barre, is that the acceptance by the bidders of the return of their bidding check bars them from the right of appeal. The position of the court was that a bond should be required for performance in the event that its ruling should be reversed in a higher court, and a satisfactory form for such bond is to be presented.

Jacobsen Increases Stock to Meet Demand of Trade

RACINE, WIS., Dec. 5—To finance production of increasing orders, the Jacobsen Mfg. Co. has increased its capital stock from $60,000 to $100,000 and on Jan. 1 will increase its operating force from 90 to 100 per cent. It manufactures the "Four-Acre Motor Driven Lawn Mower," placed on the market about a year ago and now widely used by parks, universities, colleges and schools, golf and country clubs and other institutions maintaining extensive lawn acreage.

The Jacobsen machine is in use at Yale University, Northwestern University, Chicago Park Board, Milwaukee Country Club and along the Pacific Coast. An Evanston (Ill.) concern has placed an order for 200 machines.

A. E. A. PLANS LABORATORY

CHICAGO, Dec. 5—Plans under way at the national headquarters of the Automotive Equipment Association promise to establish under the control of the association at no great distance from here a laboratory in which replacement parts and accessories will be tested and the stamp of the A. E. A. placed on them. The idea in promoting this new feature of association work is to aid the merchandising of parts and devices.

"Conservatism," Chief Lesson 1921 Taught

M. A. M. A. Queries Manufacturers on What Industry Learned During Year

NEW YORK, Dec. 5—The Motor and Accessory Manufacturers' Association asked its 400 affiliated manufacturing concerns this question:

What is the paramount lesson learned by the automotive industry in 1921?

The overwhelming majority of the responses indicates that the chief fundamental lesson learned by the automotive companies during the year was the necessity of maintaining conservative, balanced inventories.

Corollaries of this mentioned by most of the companies was the danger of over-expansion and over-optimism; the menace of "over" overhead; the necessity for rigid, but sound, economies; and the elimination of "rainbow chasing" from business.

General conservatism in buying, greater prudence in making commitments and closer period buying are mentioned by virtually all the executives who contributed to the symposium as last year's principal contribution to business wisdom.

Must Be Guided By Consumer

Another significant recurrent note in most of the statements is the lesson learned by manufacturers that the viewpoint of the ultimate consumer must to a greater extent guide production and distribution policies.

The experience of the automotive industry last year, in the opinion of a leading automobile engine manufacturer whose statement is typical of the rest, will be "enormously beneficial in guiding the future policies of the industry. It has taught every one the need for closer period buying."

One of the largest axle manufacturers in the United States sums up the lessons of 1921 thus:

"The paramount thing taught by last year's experience is that the saturation point has been switched from manufacturers' production to used cars, and that until those now in the hands of the dealers can be disposed of there should be a decided contraction in the new product."

A representative unit manufacturer says:

"We must pay attention to fundamental principles in manufacture and in business. Our inventories must be kept within reasonable bounds; we should not sign contracts more or less blindly and, in short, we should conform to the laws of sane business, which for some reason or other we seemed to have forgotten during the preceding few years.

"We have learned, also, of the evils of 'over' overhead; we have learned how to economize in our shops; we are thrifty, whereas always in the past we have been reckless; and we are thinking more of what the public or our customers want, rather than what we feel they should use."

Milwaukee Prepares For Steady Output

Nature and Volume of Orders Most Encouraging Since July 1

MILWAUKEE, Dec. 5—The manufacturing situation in the automotive industries at the beginning of December is one of excellent prospects, compared with most other months this year. Makers of parts, engines, bodies and equipment look for a fairly active month, but the real optimism lies in the fact that orders taken during November and so far this month, for delivery beginning immediately after Jan. 1, are of a more encouraging nature and volume than since July 1.

Inventory Period Advanced

In fact, these orders in the case of numerous large manufacturers are such that it was deemed advisable to advance the usual inventory period at the close of December, or over the holidays, to the latter part of November, so that the decks might be cleared for steady production. There is nothing startling or sensational about these orders, but they are so much better than the regular run of business in recent months that favorable comment has been aroused in respect to definite improvement in business.

Usually December is a quiet month in all metal trades lines, but this year it doubtless will develop into an unusually active one, athough most of the activity is based on preparation for a general upward tendency of production beginning with the New Year. A high spot in the situation is the pressure exerted by orders upon manufacturers of enclosed bodies, of which there are numerous large interests here.

Retail Trade as Usual

Some quickening of retail demand for passenger cars is observed on the basis of successful solicitation of Christmas business although in a general way trade is of about the usual early December character. The absence of any heavy snowfall so far this winter has helped business, for the season still is of such quality that motorists are able to make the freest possible use of cars.

This month usually is the slowest of the year for retail sales, and probably will be only an average one. However, with the annual Milwaukee show coming in six weeks, local dealers expect to experience the usual resumption of consumer interest which this event always excites. Enclosed car sales at this time are running from 15 to 25 per cent ahead of a year ago.

RUGGLES ELECTS OFFICERS

DETROIT, Dec. 5—The Ruggles Motor Truck Co., Saginaw, which recently acquired the Huron Motor Truck Co., has elected the following officers and directors: Frank W. Ruggles, president; W. J. Wickes and Julius B. Kirby, vice-presidents; Ezra L. Smith, secretary; Charles T. Kerry, treasurer; John F. O'Keefe, counsel; directors, the officers and Benton Hanchett, Otto L. Dittmar, H. T. Robinson, Guy S. Garber and Walter C. Hill, all of Saginaw; Harry H. Price, Columbus, Ohio; John J. Thorne, Bay City; John Ryan and Albert E. Sleeper, Bad Axe.

Hampden Motors Formed to Make 2-Ton Trucks

HOLYOKE, MASS., Dec. 5—The Hampden Motor Truck Corp. has been organized with $1,000,000 capital to engage in the manufacture of 2-ton trucks. A site of eight acres has been purchased in Willimansett, and plans have been drawn for a one-story brick factory comprising two acres of floor space.

It is proposed to build only one model to sell for around $2,000, and to be ready for production to begin next spring. Though not built primarily for speed, the truck will be of somewhat lighter design than usual for a vehicle of the size. Concentration on one model is expected to be an element of economy, and distribution will be simplified by selling direct through established dealers. A number of original ideas in construction are planned.

The corporation is composed of Holyoke men with these officers: President, Richard D. Bloom; vice-president, John F. Lynch; treasurer, Ernest S. Steele; directors, R. L. Davenport, John H. Woods, C. H. Collins, F. G. Burnham and C. P. Lyman.

Pierce-Arrow Awarded New York City Contracts

BUFFALO, Dec. 5—The city of New York has awarded to the Pierce-Arrow Motor Car Co. a contract for 87 heavy duty motor trucks with a total value of $350,000.

The order will place the production capacity of the company's truck department at about 100 per cent. At present it is running a little above 90 per cent.

The trucks are to be used by the department of streets, some of them in the city's snow fleet.

Compromise Offer Made on Shuler Axle Claims

LOUISVILLE, KY., Dec. 5—A compromise offer of 20 per cent on claims was made by Charles B. Seymour, attorney, in behalf of the Shuler Axle Mfg. Co. at a hearing before Judge George A. Brent, referee in bankruptcy.

Action on the offer has been set for Dec. 14 by Judge Brent and if 51 per cent of the creditors accept by that time the suggested settlement will be confirmed. According to Elliott Pennebaker, attorney representing 80 per cent of the creditors, the claims against the Shuler company aggregate $100,000.

Claims Combination Enhanced Oil Prices

Federal Trade Commission Makes Report on Pacific Coast Petroleum Industry

WASHINGTON, Dec. 5—Charges that prices of gasoline and other motor fuels sold on the Pacific Coast were unduly enhanced by so-called combinations among oil companies are made by the Federal Trade Commission in part 2 of its report on the Pacific Coast petroleum industry, as submitted in response to a special resolution introduced by Senator Poindexter of Washington, in the first session of the Sixty-sixth Congress. The report contains a large number of letters and documents giving in detail what purports to be evidence of agreements and understandings covering prices.

Marketers Association Mentioned

The commission accuses the Independent Petroleum Marketers Association of Los Angeles of having arrived at an understanding on prices in 1915. This report is especially interesting to the automobile industry because of the fact that the acute gasoline shortage on the Pacific Coast on two or three occasions during this period resulted in heavy losses to manufacturers and dealers through restricted sales, etc.

According to the report of the commission:

"The retail price of gasoline at San Francisco increased from 15.5 cents per gallon in January, 1914, to 27 cents per gallon before the end of 1920. The wholesale tank wagon price of kerosene at San Francisco remained at 9 cents per gallon from January, 1914, to August, 1918, after which time it advanced rapidly to 16.5 cents by the end of 1920; kerosene price changes are influenced largely by conditions in the export market.

"While the increases in the prices of these refined products were not so marked as the advances in crude prices, owing chiefly to less pronounced increases in transportation, refining and marketing costs, the refining and marketing departments of the large companies, during the later years of this period, especially in 1919, made on the average much higher rates of profit on investment.

"From 1916 to 1920, a period of marked price advances, the wholesale prices of the large marketing companies for gasoline and engine distillate sold to garages and other resellers were practically uniform, as were also the retail prices at their own service stations."

Standard Group Dominant

In conclusion, the report, which was signed by all the members of the commission, read:

"This dominant position of the Standard group in the petroleum industry of the United States is due not merely to the magnitude of its various units with respect to production and capital investment, but also because of its solidarity, arising apparently from an interlocking stock ownership resting largely in the hands of a few great capitalists and from its great financial resources and credit."

Optimism Prevails at Tractor Meeting

All Manufacturers See End of Depression With 1922 Prospects Good

CHICAGO, Dec. 5—The members of the tractor and thresher department of the National Association of Farm Equipment Manufacturers (formerly the N. I. V. A.), who came here to attend the annual meeting of this section, left for their homes greatly encouraged for the prospects of 1922. It appears that each of these manufacturers came knowing that in his own business he had found very strong signs that the corner had been turned. He was wondering if the other manufacturers had found the same indications.

Black Discusses Outlook

During the meeting it developed that all manufacturers believed that the deep depression of 1921 was past and certainly 1922 would be better. Both in the meeting and in the corridor talks there was every evidence of optimism.

The meeting devoted itself very closely to business affairs and the discussions were very generally participated in. The high points were discussion of a service plan; the Minneapolis Power Farming Show, and the Power Farm Bureau, on all of which definite action was taken.

The most impressive feature of the program was a paper on the "1922 Outlook" by William Black, president of the national association. Black discussed at length the conditions that had confronted the industry since the slump and pointed definitely to the influence that was certain to make 1922 a better year.

Minneapolis Show to Be Held

The present status of the railroad situation was discussed exhaustively in the regular session by W. H. Stackhouse, and at the banquet by F. R. Todd. An interesting feature of this discussion was the report of the work that the committee of the national association is doing to assist in putting railroad rates and railroad management on a better basis, and the strong pleas in this regard that are being made to Congress.

It was evident from the discussion on the floor that there had been considerable criticism of the Minneapolis show plan. This was thoroughly discussed and a vote of confidence given to the show committee. J. B. Bartholomew, chairman of the committee, stated that he personally would solicit every tractor manufacturer, who is a member of the association, to put exhibits in this show. The manufacturers personally believed that the apathy of the Minneapolis dealers and public was due to a wrong impression that could be overcome.

Bartholomew was supported by Finley P. Mount and E. J. Gittins. Mount said that he was enthusiastically for the tractor show as planned, and he did not propose that any factory branch managers should "gum up" the proceedings. He said that possibly their own branch manager was one of these, but there must be a change of attitude, and so far as the committee was concerned, they were going ahead with the show even if they had to allot the space not taken to the exhibitors who had taken space. The meeting left no doubt that the show will be held as planned.

(*Continued on page* 1146)

TRUCKS PROVE SAVING IN COTTON SHIPMENTS

GRIFFIN, GA., Dec. 5—Cotton in this vicinity is being transported to domestic mills with the aid of motor trucks at an average saving of approximately $1 per bale as compared with railroad freight charges, with the added advantage that deliveries are being made much more promptly.

Paige-Detroit Subsidiary Formed to Make "Jewett"

DETROIT, Dec. 6—Jewett Motors, Inc., has been formed as a subsidiary of the Paige-Detroit Motor Car Co. to manufacture a six cylinder car to be called the Jewett which will sell in the light car, medium price class field.

The car will be first shown to dealers in the Hotel Commodore during the New York show week and the selling price and sales features will be announced at a dinner to be tendered Paige dealers by the company.

The car will be made in the Paige factories in Detroit but by an entirely separate working force and by a separate company. Officers of the new company are headed by H. M. Jewett, president of Paige-Detroit Co.

The Paige company has adopted a standard of practice which all its dealers will be advised to follow beginning at the time of introduction of the new car.

American Rolls-Royce Enlarges Force at Plant

SPRINGFIELD, MASS., Dec. 5—Rolls-Royce of America, Inc., after operating on a limited scale for two months, is increasing its factory force from week to week and is now turning out two chassis a week. The machine shop is again in operation and the assembly force much enlarged. It is expected that the normal rate of four chassis a week will be reached by the first week of January.

S. De B. Keim, sales manager, reports gratifying results from the company's exhibit at the New York salon. The company is making deliveries for shipment to California and Florida and the winter resorts of Southern Europe.

Government Moves in Lincoln Appeal

Treasury Agrees to Give Immediate Hearing Relative to $4,500,000 Tax

DETROIT, Dec. 6—Officials of the Treasury Department at Washington have agreed to give attorneys for the Detroit Trust Co., as receiver of the Lincoln Motor Co., an immediate hearing on its appeal from the $4,500,000 additional tax imposed after an adjustment by the War Department. The hearing will follow the completion of the inventory and its appraisal this week. Until something definite is learned of the course which will be followed by the Treasury Department, the receiver will be compelled to hold in abeyance any plans he may have for reorganization. It is expected it will be possible to hold a creditors' meeting by Dec. 20, and that date has been tentatively set.

Reorganization Delayed

When the details of the inventory and appraisal are presented to the Federal court the receiver will recommend that operations be continued. The outlook for business is regarded as favorable and models now are being built for the New York and Chicago shows. They will follow new lines in body work.

No serious attempt at reorganization can be made while the Government claim is pending. When it was originally filed several months ago the bill was for $5,700,000 but this was reduced by $1,200,000. Filing of this claim prevented the company from putting through any refinancing plan and was one of the reasons for the receivership.

Mortgage as First Lien

It is contended that unless the government succeeds in establishing the tax claim as a prior lien, which is considered improbable, the mortgage against the plant will come first. The majority members of the board of directors who forced the receivership own a large part of the $1,250,000 in bonds outstanding and are joint endorsers with Henry M. Leland and his son of $4,000,000 in bank notes. The Lelands had their entire fortune invested in the company and this is regarded as practically lost.

There are approximately 2000 owners of the $8,000,000 in class A stock. The Lincoln Motor Co. holds 15,165 shares. The largest individual holder is George F. Fuller of Worcester, Mass., who owns 4550 shares. Sybil H. Fuller owns 3000 shares. Fred T. Murphy, William H. Murphy and Mrs. Rebecca Murphy together own 5400 shares.

NEWFOUNDLAND AIR SERVICE

ST. JOHN'S, NEWFOUNDLAND, Dec. 5—The Newfoundland Government has inaugurated an aerial mail service between St. John's and Halifax with North Sydney as a port of call.

19,645,248 Casings Made During Year

Output of Inner Tubes Aggregates 24,417,229 and of Solid Tires, 377,823

NEW YORK, Dec. 5—Production of pneumatic casings by the tire manufacturers who are members of the Rubber Association of America, which means approximately 97 per cent of the total production in the country, was 19,645,248 for the calendar year ended Oct. 31. Shipments for the same period totaled 22,133,940. The excess of shipments over production was taken from the stocks in storage which stood at 5,170,920 at the end of November 1920 but which had been reduced at the close of October last to 3,545,030.

Shipments Exceed Output

Production of inner tubes for the calendar year totaled 24,417,229 while shipments were 26,292,718. This excess also was taken from the stocks on hand which had been reduced at the close of October to 4,732,016. Solid tire production aggregated 377,823 and shipments 530,897.

Production of pneumatic casings in October amounted to 1,928,271 and was almost identical with the production in September, when the total was 1,929,268. There was a sharp falling off in shipments in October, however, the total being 1.675,169 as compared with 2,047,929 in September. Shipment figures were the lowest since March, when they were 1,614,651. Inner tube production fell off from 3,274,828 in September to 2,843,918 in October. Shipments, however, were 2,016,371 as compared with 2,645,758 the previous month.

Statistics of Industry

The detailed figures for the year by months as compiled by the rubber association for the Bureau of Foreign and Domestic Commerce, follow:

PNEUMATIC CASINGS

1920	Inventory	Production	Shipments
Nov.	5,170,928	915,651	1,262,159
Dec.	5,508,380	506,111	1,327,153
1921			
Jan.	5,319,605	703,430	965,417
Feb.	5,193,018	819,892	1,073,756
Mar.	4,597,103	1,163,314	1,614,651
Apr.	4,527,445	1,651,418	1,785,951
May	4,451,668	2,100,917	2,085,882
June	4,154,456	2,313,265	2,643,850
July	3,892,037	2,570,524	2,757,581
Aug.	3,934,583	3,043,187	2,894,442
Sept.	3,340,798	1,929,268	2,047,929
Oct.	3,545,030	1,928,271	1,675,169

INNER TUBES

1920	Inventory	Production	Shipments
Nov.	5,480,354	1,002,886	1,366,977
Dec.	5,786,929	508,446	1,481,285
1921			
Jan.	5,586,163	740,824	1,042,617
Feb.	5,415,464	916,627	1,129,881
Mar.	5,044,861	1,346,483	1,643,690
Apr.	4,916,772	1,862,122	1,983,571
May	4,751,880	2,210,040	2,342,567
June	3,835,098	2,359,928	3,232,673
July	3,122,815	3,020,981	3,603,248
Aug.	3,649,319	4,430,152	3,804,060
Sept.	3,827,830	3,274,822	2,645,758
Oct.	4,732,016	2,843,918	2,016,371

SOLID TIRES

1920	Inventory	Production	Shipments
Nov.	294,043	23,299	36,628
Dec.	303,473	16,297	40,828
1921			
Jan.	303,753	21,220	29,116
Feb.	304,374	23,355	29,599
Mar.	283,800	28,710	43,926
Apr.	269,985	28,859	42,080
May	264,633	35,156	40,122
June	240,336	28,395	49,867
July	220,003	35,123	55,678
Aug.	216,367	55,694	66,866
Sept.	161,832	37,441	50,276
Oct.	163,299	46,274	45,911

"Production" and "Shipments" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" include only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

TIRE FREIGHT RATES CUT TO WEST COAST

NEW YORK, Dec. 5—The traffic committee of the Rubber Association of America announces that as a result of negotiations which have been carried on for some time the westbound freight rate on tires to the coast has been reduced more than 30 per cent.

The carriers have agreed to establish a rate of $2.75 per 100 lbs. from eastern shipping points to Pacific Coast ports reached by water lines, Los Angeles to Seattle inclusive, to meet water competition through the Panama Canal.

It will be necessary to submit this proposal to the Interstate Commerce Commission and for that reason it is impossible to state the exact date upon which the new rates will become effective.

International Wheel Preparing to Produce

TORONTO, Dec. 5—The Syndicate of Toronto, Montreal and Hamilton capitalists which has formed the International Wheel & Rim Co., Ltd., to manufacture a double disc steel automobile wheel under the Culp and Crenan patents is making arrangements to get into production.

Dies for the wheels as well as for the new Culp demountable rim are being made. Joseph N. Crenan is president and general manager of the company. He states that he has orders for a number of test wheels from several Canadian car manufacturers as well as from most of the Canadian jobbers.

U. S. RUBBER HAS NEW TUBE

NEW YORK, Dec. 5—A new inner tube has been placed on the market by the United States Rubber Co. It will be sold under the name of Royal Tube and will be of the same general quality as the Royal cord tire. Improvements in construction are said to give the tube increased life and greater adaptability to repair work.

Tire Outlook Good, Seiberling States

Says Industry Has Passed Turning Point and Is on Up-Grade

AKRON, Dec. 5—"Business has quite definitely turned the corner, but prosperity waits on the restoration of the buying power of America's greatest commercial asset—the farmer," states F. A. Seiberling, president of the Seiberling Rubber Co. of Akron.

He believes the automotive industry, in the last analysis, is dependent upon the farmer, and the prosperity of the farmer, saying, "For not only is he the biggest buyer of automobiles himself, but the trade he creates means automobiles and motor trucks for other people. But the farmer cannot buy automobiles on 'dollar wheat' that costs him 50 cents or more to get to the market."

Improvement to Be Steady

The tire industry, according to Seiberling, long since has passed the turning point and is steadily on the upgrade. Stocks have been largely absorbed, he explained, and the business to-day is as near sound readjustment as any basic industry in the country.

"Consumption of tires in 1922 is certain to be greater than that of the present year, and the industry will experience a steady increase following the improvement in general business and the expansion of the automobile trade," he adds.

Seiberling believes the improvement in business will not be rapid, but steady, and that it will not jump straight up from "low" to "high." He says the world will never be able to get away from rubber as a material in the construction of tires. Rubber supplies, he states, are abnormal at present. There is more than a year's supply of rubber now on hand in the United States, he estimates. Prices of tires are in proper adjustment with the prices of raw materials.

American Bosch Program Launched at Conference

SPRINGFIELD, Dec. 5—For the purpose of launching a broader sales campaign in respect to its new automotive products, the American Bosch Magneto Corp., called its branch managers and district salesmen from New York, Chicago and Detroit into conference here.

Alfred H. Bartsch, general sales manager, led in a discussion of plans for appointing new representatives in various cities and otherwise extending sales and service. These arrangements follow the plan of maintaining close relations with all the dealers, with a view to expanding the production and use of devices now being introduced, comprising magneto fittings, impulse couplings, starting motors, generators, battery ignition systems, and numerous small accessories.

Two Plans Favored in Used Car Problem

Manufacturers Would Act on One Proposal; Dealers Would Support Other

NEW YORK, Dec. 5—The survey made by the National Automobile Chamber of Commerce in the hope of finding some definite means of solving the used car problem shows that two definite plans seem to be most favored by automobile dealers. The first of these would be acted upon by the manufacturers and the other would be supported by the dealers. The proposals are:

1.—Each manufacturer, in advertising his new cars, to advertise also the market price of his older models.

2.—Dealers in each locality to authorize one or more public appraisers similar to real estate appraisers who for a fee paid by the dealer will give the sales value of any car submitted by dealer or customer.

Would Advertise Prices

In explaining these plans in an address before the Washington, D. C., Automotive Association, the following explanation was made by Alfred Reeves, general manager of the N. A. C. C.:

"Under the first plan the manufacturer will advertise the sales price of his older models in good condition, based upon reports from around the country. It should not be necessary to give values of cars less than 18 months or more than four years old.

"The plan would give some protection to the new car dealer because a customer could hardly ask for a greater allowance than he knew could be obtained for his used car. Any dealer exceeding this allowance would do it with the knowledge that he is inviting a loss which loss he is apt to take by promptly selling the car at the known sales value. This plan it is felt would increase respect for the second hand car.

Provides for Appraisers

"Under the second plan, the dealers in each locality would appoint a certain number of appraisers to appraise second hand cars offered in trade. These men at proper quarters, with experts, would judge the condition of the car and issue a certificate to the owner giving a value that would be recognized by all dealers.

"The dealers would pay a fee of $2 or more to the appraiser, who would be entirely independent of any particular dealer. He would be appointed for his ability, just as certain real estate appraisers are recognized by real estate firms.

"Such a plan would give dealers a true knowledge of the value of the car. Of course, nothing could prevent any dealer from allowing a sum in excess of the appraised valuation, but in so doing he would be incurring a loss with his eyes open. Customers, as a rule, expect the dealer to make a fair profit. Owners of used cars, unfortunately, overestimate their value and where there is no official appraisement in opposition they are generally good enough salesmen to sell the dealer a car for more than its worth.

"No matter what plan may be finally approved by manufacturers and dealers, the fact remains that the used car problem will continue to be a menace until the dealers learn enough about values to buy second hand cars enthusiastically, for a profit, and not with depressed spirits at prices which they know are certain to involve a loss. I can think of no better slogan to help the used car problem than for everyone concerned to 'buy them right'."

Reeves contended that the real fundamental in the solution of the problem is to take in the used car at the right price, "which means a price that will enable it to be sold at a profit."

Battery Stockholders Decide Reorganization

HAMMOND, IND., Dec. 5—On petition of the Indiana Box Co., East Chicago, a receiver was appointed in the Superior Court here for the OK Giant Battery Corp. The claim of the petitioner was for about $300 for shipping boxes for batteries. At the same time the order for a receiver was entered the court ordered the sale of the battery plant for delinquent taxes setting the sale for Dec. 3. A restraining order was secured by some of the stockholders and the sale was stopped.

Previously twenty-five of the battery company stockholders held a meeting at which it was decided to reorganize the company, the plan including the appointment of a stockholders' committee to take charge of the plant as soon as the receivership is ended. A. G. Slocum, former secretary of the OK Battery Corp., is receiver.

Lay Reorganization Plans for Kelley Tire Company

HARTFORD, CONN., Dec. 5—Plans for the reorganization of the Kelley Tire & Rubber Co. have been started through Edward Newman, a New York lawyer, who heads a group of stockholders and the law firm of Holden & Peck of the stockholders' committee. Receiver A. H. Barclay of New Haven is not yet ready to announce the plan but states that negotiations are in progress.

It is said that the stockholders are to buy bonds of the company and receive a bonus in preferred stock but that all stockholders will receive an allotment of common stock whether or not they go into the refinancing plan.

November Sales Remain Steady in New Orleans

NEW ORLEANS, Dec. 5—Leading automobile dealers here say that sales for November have held up well, especially during the first three weeks of the month. The fourth week was somewhat slack with prospective purchasers more inclined to talk of waiting until the first of the year.

New cars have been in better demand than used automobiles. The latter continue to move slowly and the supply on hand still appears ample to preclude possibility of any notable early improvement in that line.

Bock Bearing Plant Is Profitable Unit

Economy Program of Standard Parts Does Not Consider Its Sale

CLEVELAND, Dec. 6—There has been outlined for the Standard Parts Co. a program of economy that in operation under the administration of receiver Frank Scott has resulted in the payments of dividends of $2,000,000 to creditors within a short time, and has put the company in an excellent condition for the future.

A part of this economy program is the sale of certain plants, a series of consolidations, rearrangements of plants and changes in the methods of handling material. The program for sales of plants that are a part of the $20,000,000 parent corporation that is engaged in the manufacture of automobile accessories and parts became known here to-day.

Bock Not Sold

Some time ago a small establishment 2½ miles distant from the main plant of the Bock Bearing Co. at Toledo was sold. This gave rise to the report that the Bock Bearing plant, a unit of Standard Parts, had changed hands, but this was denied at general offices of Standard Parts here. It was said the Bock Bearing plant is one of the most profitable units of the parent concern, that it has not been sold and that it is not for sale. In the small plant that was sold but a single operation was performed and it was disposed of under the general economy plan.

The American Ball Bearing Axle plant in this city is for sale, while the forge plant at Canton has been sold, pending confirmation of the court, and the plant of the Spring Co. at Canton is on the market. The work that was done in the Spring plant at Canton has been transferred to the Perfection Spring plant in this city and a considerable saving has been effected.

The Hess-Carphage Axle plant at Cincinnati also is for sale. It will be disposed of as a going concern. When the plants that are on the market are disposed of the Standard Parts will have as remaining units the Perfection Spring Co., the Eaton Axle Co., Standard Welding Co., Bock Bearing Co. and the Spring service stations at New York City, Boston and Cleveland, as well as the Pontiac Spring Co.

G. M. BUILDING READY JUNE 1.

DETROIT, Dec. 6—General Motors will begin work to complete finishings on its office building here soon after the first of the year. By June 1 it is hoped to have the entire structure ready for occupancy. Most of the interior work remains to be done on the west wing. Decision to complete the building came in connection with the recent sale of $12,000,000 bonds.

REACH AGREEMENT IN WILLYS ACTION

Plan Satisfactory to All Interests

Provides for Retention of Miniger as Receiver—Kennison Kept in Ohio

(*Continued from page* 1136)

Judge Bodine will be asked to reappoint Miniger to co-operate with the other two receivers already designated by him. It was agreed at the conference that this plan would be appropriate because it would assure the other receivers the benefit of Miniger's long and successful experience as a manufacturer in their attempt to solve the problems growing out of the big new plant of the corporation at Elizabeth where the Chrysler six was to have been built.

Bankers Attend Conference

The conference yesterday was attended by representatives of the Chase National, Chemical National, New York Trust and Equitable Trust of this city as well as by attorneys for the bank creditors' committee. Other banks which sent representatives were the First National of St. Louis and the Merchants' Loan & Trust Co. of Chicago. The receivers and interests in Ohio were represented by Toledo attorneys. Willys attended personally with his counsel. James P. Cotton represented the first preferred stockholders, Littleton Fox the second preferred stockholders and Col. J. M. Hartfield the merchandise and construction creditors.

A statement in behalf of the bank creditors' committee was made after the conference by J. A. Bower, vice-president of the New York Trust Co. He said there were sufficient assets to meet all claims against the Willys Corp. and he emphasized the fact that the Willys-Overland Co. is not involved financially by the receivership.

Has Many Assets

It was pointed out by Bower that the Willys Corp. has a large amount of assets to cover its obligations which have been estimated at between $10,000,000 and $14,000,000. One of them is the Elizabeth plant which is valued at $8,000,000 and rated as one of the finest production plants in the world. Other valuable assets are the New Process Gear plant at Syracuse and the Electric Auto Light plant at Toledo with various smaller companies. The Willys Corp. also holds 33 per cent of the stock of the Willys-Overland Co. and several million dollars' worth of stock in the Fisk and Federal rubber companies. These stocks are said to approximate $20,000,000.

A statement made by Alfred A. Cook attorney for the New York Trust Co., said:

"Every interest is desirous of the carrying out of the program of amicable adjustment. There are plenty of assets to cover all liabilities and all of us wish to correct the erroneous impression that the Willys-Overland Co. is affected. Willys-Overland is solvent and sound."

Definite plans have not yet been evolved for the straightening out of the difficulties of the corporation. The Elizabeth plant is the only unproductive unit and it is considered certain that an effort will be made to sell this property. The New Jersey receivers announced Saturday that they would attempt at the earliest possible moment to get rid of it and that the first chance to buy would be given the bank creditors. The "peace conference" may modify this plan in some respects but not the determination to get rid of the Elizabeth property. All Willys interests feel that beyond the sale of the Elizabeth factory there should be no dismemberment of the corporation and that the various other plants should be operated under its direction.

U. S. Light Not Involved

A statement has been issued by the United States Light & Heat Corp., Niagara Falls, asserting that it is not involved in the receivership and that the only connection between it and the Willys Corp. is that its preferred stock is owned by the Willys Corp.

Sale of the Elizabeth plant would make it possible to apply the earnings of the Electric Auto-Lite Corp. and the other producing companies to the liquidation of the obligations. Up to this time half the earnings of Auto-Lite have been used in paying for the maintenance of the big factory in New Jersey where a skeleton organization had been maintained in the expectation of beginning production in the near future on the Chrysler car.

The amicable agreement which has been reached is expected ultimately to result in payment of all debts and the preservation of substantial equities for the various classes of stockholders through reorganization and refinancing under the receivership.

Union Insurance Acquires Motor Mutual Indemnity

KANSAS CITY, Dec. 5—J. B. Sackett, President of the Union Insurance Co. of Wichita, Kan., announces that he and his associates have taken over the Motor Mutual Indemnity of Kansas City and will move its home office to Wichita. It was organized in November, 1920, but has done almost no business.

It is the purpose of the new management to write fire and theft insurance on automobiles at manual rates and accept as assured only members of the Anti-Automobile Thief Association of America.

Cooperation Urged by Court in Newark

Willys Files Affidavit Setting Forth Steps Which Led to Action

(*Continued from page* 1136)

istration that Messrs. Kennison and Miniger be retained with him."

In his affidavit, Willys also set forth that he and his family owned approximately 80 per cent of the common capital stock of the company. This represented property and securities contributed to the corporation by him worth more than $14,000,000 when the former Electric Auto-Lite Corp. became the Willys Corp.

Willys Sought Harmony

"During the past eight months," the affidavit went on, "efforts have been made to which I have lent all the assistance in my power, to bring about an agreement, but it has proved impossible to reconcile the various conflicting interests."

The banking group's reorganization plan was abandoned early in November, he said, and to save the situation, he proposed the staving off of a receivership by putting liquidating power in the hands of a representative committee This the bankers would not accept, he claimed.

"The only counter suggestion," the affidavit proceeded, "was that the Auto-Lite and New Process Gear plants be transferred at once to subsidiary corporations so as not to be affected by a receivership. This might violate restrictions governing first preferred stock and cause serious liabilities for the directors without the consent of 75 per cent of the first preferred stock, which it was not practicable to obtain. With no plan of reorganization in sight, the affairs of the corporation were left in a truly desperate position.

Agreed on Receivership

"My information was that some individual shareholder was trying to precipitate some form of receivership, and a possible receivership in creditor's action was also mentioned.

"I was informed the bank creditors were investigating the question of auctioning off component units of the enterprise, a program which, if carried out, meant disaster to all classes of stockholders. This latest circumstance undermined my confidence and the confidence of other directors in regard to receiving further co-operation from the bank creditors' committee in preserving the enterprise."

Then followed information on the directors' decision at a regular adjourned meeting to accept a receivership.

"The plan of receivership," said Willys, "reflected the conscientious convictions of myself and the other directors that we should accept the protection of the court."

"The chief function of the receivership in

(*Continued on next page*)

Urges Cooperation in Willys Action

New Jersey Court Acts—Affidavit Pertaining to Receivership Filed

(*Continued from preceding page*)

the New York jurisdiction," the affidavit ran on, "will be to take custody of stocks and securities. By the force of circumstances, the most important business activities of the defendant will be in its manufacturing operations at Toledo. Therefore, there was no impropriety in the directors consenting to the primary jurisdiction taken by Toledo.

"The ultimate payment of all debts is assured, and that all shareholders have substantial equities to preserve is established beyond doubt by the great value of the treasury assets and the earning power of the Auto-Lite and the New Process plant, without considering the other large investments. A reconstruction value of $10,000,000 was recently placed upon the Elizabeth plant."

Refutes Aspersions

The affidavit next presented information relative to the 739,000 shares of Willys-Overland stock held by the Willys Corp. This stock has a book value of $18 a share, exclusive of goodwill, it was stated, and an end of business depression would make this asset equal four-fifths of the corporation's total debts.

Willys then asked the privilege of refuting certain aspersions.

"I was never a stockholder nor officer nor director of the Ohio Savings Bank & Trust Co., and I am not a borrower there and have no personal dealings. I have no influence over it. In fact, I failed to persuade it to join the bank creditors' committee.

"The allegation that the majority of the directors of the Willys Corp. and of the Willys-Overland Co. are dominated and controlled by me does an injustice to the officers of the companies. I suggested Miniger for receiver with no thought to dominate, and he would not stand for domination anyhow, but I believed it proper that the operating head should be named.

Judge Indorses Receivers

"His name was suggested for the reason that it seemed entirely natural, proper and customary that the man at the head of the largest income producing operating unit of the defendant should become the operating receiver.

"I have no business or personal relation with Kennison, having met the gentleman less than half a dozen times in my life. I urgently requested that Judge Killits be asked not to appoint a second receiver until after all committees and other interested parties had been notified, but the court declined to appoint an operating receiver alone and named Kennison as his own selection."

Willys told of the sale of Willys-Overland stock to the Willys Corp., pointing out the care with which the transaction was made, and he remarked: "There is nothing in the transaction upon which any personal liability on the part of the directors who participated in it can be predicated."

A letter from Judge Killits endorsing Kennison and Miniger, which was read to Judge Bodine by their counsel, Thomas H. Tracy, was addressed to Federal Judge Hough, who had been expected to handle the case in New York, and was as follows:

"I am sending this by Messrs. Miniger and Kennison, whom I appointed receivers for the Willys Corp., and am glad to have the opportunity to thus make you acquainted with each of these gentlemen. Miniger has been for a long time the successful administrator of the affairs of the defendant and is competent in every conceivable way to administer the estate for the court from an operating and marketing end of the business.

"I deemed it best to appoint two receivers because of the magnitude of the business of the corporation and the diversity of interests to be represented, and selected of my own choice Kennison as the second receiver. I have known him for a long time as favorably as I have known Miniger and have every confidence in his capacity to faithfully serve the court in this position. He has no connection whatever with the Willys Corp. For a long time he has been closely identified with banking and commercial matters in this city."

Affidavits were presented on the ability and character of Kennison and Miniger, along with a letter from Judge Killits attesting that Kennison had been his personal choice for receiver, and that Kennison had no connection with Willys.

Repudiation "Almost Criminal"

"This company," declared Conover English, associated with Tracy, "is successful in Ohio, and the man who has made this possible was Miniger. Judge Killits may feel that if his receivers are repudiated, he should shut down on money for the New Jersey plant. There should be a close connection between Toledo and New Jersey."

"It would be almost criminal," remarked Judge Bodine, "to throw out an experienced operating man where a plant is operating, but we don't have any operating problem in New Jersey."

Predicts 50 to 100 Miles on Gallon of Gasoline

DETROIT, Dec. 6—Fifty to one hundred miles per gallon of gasoline is a development in the motor car industry not far removed, according to C. F. Kettering, president of the General Motors Research Corp. and vice-president of the General Motors Corp. He made the assertion in an address to "Gold Medal Men" of the Cadillac Motor Car Co. at a dinner at the plant last evening. Gold medals were presented to 81 men employees and gold rings to four women employees, all of whom have been with the company 10 years.

"Increased mileage will come about through a change in the method of refining gasoline," Kettering said. "We know there now is a constructive attitude on the part of the oil companies to refine oil along the right lines. It is possible to-day easily to double the mileage and when this has been done a lot of trouble with the automobiles will be solved, such as elimination of carbon.

"The use of gasoline was more or less accidental," Kettering explained. "No one asked if it was the right thing for the motor car. It was the nearest thing at hand. Gasoline was then simply a by-product almost to be had for the asking."

Planning for Show Week in New York

Various Organizations Set Dates and Places for Annual Meetings

NEW YORK, Dec. 5—With interest in the coming New York show keener than ever before, the national organizations of the automotive industry with headquarters here are making unusually elaborate preparations for the week, which is the busiest of the year for them. The number of exhibits at the show itself will establish a new record and an unusually large number of announcements which will be important to the trade are expected.

Arrange For Dinners

Preliminary arrangements are well under way for the annual dinners to be held during the show. The Rubber Association of America will dine at the Waldorf Monday evening, Jan. 9. The first dinner of the Old Timers' Association will be held the same evening. The dinner of the National Automobile Chamber of Commerce will be held at the Commodore on Tuesday evening, that of the Motor and Accessory Manufacturers' Association Wednesday at the same hotel and the banquet of the Society of Automotive Engineers at the Astor, Thursday evening.

Meeting Dates Set

The annual meeting of the Rubber Association of America for the election of officers will be held at the Waldorf Monday afternoon. The annual meeting of the M. A. M. A. will be held at the Commodore Wednesday afternoon. The directors of the N. A. C. C. also will meet Wednesday. A large number of more or less incidental meetings of dealers and committees will be held during the week. It is probable manufacturers will devote more than the usual amount of attention to arousing greater interest among dealers.

Show Roster Changed

NEW YORK, Dec. 6—Several changes have been made in the past few days in the roster of exhibits at the New York and Chicago automobile shows. The Jackson Motors Corp. of Jackson, Mich., will exhibit only at Chicago and the William Small Co. of Indianapolis, which makes the Monroe car, has withdrawn from both shows. This places the total makes of cars to be displayed at New York at 92 and the figure for Chicago is 80.

The show management has been informed that the New York dealers propose to make the exposition this year a "selling show" and they are making plans to take prospects in large numbers to the Grand Central Palace. The color scheme of the decerations this year will be purple and gold with purple predominating.

Naming Field Force for Rickenbacker

Eighty Distributors Will Be Appointed on Five-Year Contracts

DETROIT, Dec. 7—Distribution of the new Rickenbacker car will be through a strong distributor organization working upon a five-year contract with the factory. By March 1 distributors will have been named in 25 to 30 leading centers of the United States and additional territories will be allotted as fast as production at the plant permits.

Dealers to Be Protected

In determining upon the five-year contract as the basis of its sales relationships, Captain E. V. Rickenbacker, vice-president and director of sales of the company, said he regarded it as the only equitable basis upon which a substantial dealer should be asked to operate. Because of the long tenure of the contract, Rickenbacker said, great care would be exercised by the company in naming its representatives, which accounted for the apparent delay in announcing its sales organization.

Under the contract no dealer can either forego his obligations or be removed by the factory except for cause. Every dealer will be protected against loss through price reductions by a special clause guaranteeing against this. Territorial lines will be strictly drawn and enforced.

May Handle Other Lines

No dealer will be required to handle the Rickenbacker line exclusively, the only obligation in this respect being that he handle no other car in the general class of the Rickenbacker. By handling two or more non-conflicting lines, Rickenbacker declared, a dealer can make substantial reductions in his overhead and a competent dealer, he said, can handle several lines with equal fairness to all.

The company is carefully considering the used car problem, but it is considering it from the angle of the dealer who has been successful in meeting and profiting by accepting trade-ins.

Distributors in New York, Boston, Philadelphia and Chicago will be named before the first of the year and distributors in other main centers will be added from time to time until March 1. When fully organized the distributors will number about 80, Rickenbacker said. These will be expected to handle a production of 12,000 to 15,000 cars in 1922.

Hanson to Manufacture New "Little Six" Car

ATLANTA, Dec. 6—George W. Hanson, president of the Hanson Motor Co. of Atlanta, announces that the company will shortly start the manufacture of a new model to be known as the Little Six. It will have a 112-in. wheelbase and will be a companion car to the present line of Sixes manufactured by the company.

While no definite price has been announced for the new model, it is said that it will list for less than $1,000 and be the lowest priced six-cylinder car on the American market. The new car will first be shown, Hanson stated, at the New York and Chicago shows, and then at the Atlanta show.

FORD PROVING METAL CURRENCY NOT NEEDED

DETROIT, Dec. 8—To prove his contention that metal currency is not necessary to carry on the commerce of the world, Henry Ford is understood to be establishing a "food products bureau" which will enable farmers to exchange the products of the soil for Ford cars, trucks and tractors. Under the plan as it is being worked out, it is understood, Ford dealers will be authorized to barter directly with farmers, taking produce at its current market price. The dealers in turn can use this produce to pay the For company for motor vehicles.

26 Companies Included in Automotive Merger

NEW YORK, Dec. 7—Substantial progress has been made in the last few weeks in negotiations for the formation of the big automotive merger which will be known as the Associated Motor Industries, a Delaware corporation with a capital of $80,000,000. The roster of companies which will be included now contains 26 names, embracing established companies not only in the parts field but in the passenger car and truck branches of the industry. One of the purposes of the merger will be to assure the parts companies included, a definite amount of business each month through the sale of the motor vehicles which will be controlled by the parent company.

Promoters of the enterprise assert that ample financial backing has been obtained to insure the success of the enterprise and declare negotiations now have reached a point where the merger can be called an actuality. One of the cardinal points in the merger plan is a scheme for financing dealers in its products and those who purchase them.

CORBITT ANNOUNCES PRICES

HENDERSON, N. C., Dec. 6—Corbitt Motor Truck Co. has announced the following prices on its 1922 models: H, 1-ton, $1,400; E, 1½-ton, $2,200; C, 2-ton, $2,600; B, 2½-ton, $3,000; R, 3-ton, $3,200; A, 3½-4 tons, $3,800; AA, 5-ton, $4,500.

Inventories of Reo Reduced 50 Per Cent.

Olds Reports Company Enjoyed Unusually Profitable Year Despite General Conditions

DETROIT, Dec. 7—The plant and branch inventories of the Reo Motor Car Co. totalling $12,484,152.52 on Aug. 31, 1920, are shown to be reduced about 50 per cent by the statement issued as of Aug. 31, 1921. Inventories of the current year are placed at $6,556,044.15, based on market values as of the August date.

President R. E. Olds sums up the outstanding features of the year's operation in a statement accompanying the financial report, declaring the company to have enjoyed an unusually profitable year notwithstanding the conditions prevailing in most other lines of business.

Surplus $9,785,666.57

The company has in cash, drafts in transit and Government bonds, $3,255,968.46. Notes and accounts receivable of $2,823,078.49 are shown to offset current liabilities of $1,196,280.38. The ratio of current assets to current liabilities is shown to be six to one. The company has no bonds or preferred stock and has no fixed interest charges. Net profits for the fiscal year total $1,022,232.31 and after cash dividends of $693,725 there is a surplus of $9,785,666.57. The common stock is shown to have a book value of $24.10 a share.

Percentage Increase Large

Referring to the volume of business done during the year, Olds said though this was less than for 1920, the percentage of normal has been much larger than the general average of the industry.

N. A. C. C. Directors Vote to Continue Tax Program

NEW YORK, Dec. 8—Directors of the National Automobile Chamber of Commerce decided yesterday to continue their tax program for another year with the hope that it will result in the elimination of burdensome excise taxes.

Further consideration was given to suggestions made to the National Automobile Dealers Association for contract changes and it is expected a definite report on this subject will be sent out soon.

The directors made a further survey of the used car problem and a report on investigations which has been made is expected in a fortnight.

In their discussion of business conditions, the directors pointed out that practically all companies have adopted a conservative program for the winter and that no definite plans for the next year will be made until after the New York and Chicago shows, although many companies have gone to the market for the purchase of supplies on a moderate scale.

N. A. C. C. Opposes Overloading Trucks

Directors Endorse Committee Resolution—Overspeeding Is Also Condemned

NEW YORK, Dec. 7—Directors of the National Automobile Chamber of Commerce at their meeting here to-day went on record unanimously as opposed to the overloading and overspeeding of motor vehicles. This action was taken in reference to the ruling made by highway and motor vehicle authorities in the State of Connecticut that any person desiring to register a commercial motor vehicle for an increase over its load capacity must obtain from its engineering department a certificate to the effect that in the opinion of the manufacturer such vehicle is capable of being safely operated under all conditions when loaded to the increased capacity.

Certificate Giving Dangerous

The resolution in reference to this proposal, which was adopted by the motor truck committee of the N. A. C. C. at a meeting yesterday and then by the directors to-day, follows:

Whereas, The National Automobile Chamber of Commerce has consistently opposed the overloading and overspeeding of motor vehicles for the safety of the public, the protection of the investment of the operator, and the protection of the reputation of the manufacturer, and

Whereas, The National Automobile Chamber of Commerce is convinced that it must continue to oppose the overloading and overspeeding of motor vehicles for the protection of the public highways over which such vehicles operate, and for the protection of the motor vehicle industry against restrictive legislation practically prohibiting the economic operation of motor vehicles—particularly the operation of trucks engaged in the transportation of people and product, and

Whereas, certain states have enacted laws permitting the registration of motor vehicles with a carrying capacity in excess of the manufacturers' rated carrying capacity upon the production of a certificate from the manufacturer that such motor vehicle can be "SAFELY OPERATED" "UNDER ALL CONDITIONS" "AT ALL TIMES," and some manufacturers have given such certificates, and

Whereas, it is the conclusion of the National Automobile Chamber of Commerce that the giving of such certificates authorizing the carrying of loads in excess of the rated carrying capacity of such motor vehicles, under the conditions of such laws, is dangerous because of, first: contingent liability on the manufacturer in case of accident, both personal liability and property damage; second, claims under the manufacturer's warranty for breakage and defects resulting from overloading authorized by such certificates; third, for the far more important reason that the acquiescence of motor vehicle manufacturers to overloading will be immediately seized upon by legislators as a basis for further restrictive legislation and higher license fees, and will immediately deprive the manufacturers of the co-operation of the Bureau of Public Roads of the Department of Agriculture, the State Highway Commissioners and public road officials, in their attempt to reach a practical solution of the highway problem in its relation to motor vehicle transportation; and fourth, the granting of certificates by manufacturers permitting overloading violates not only every engineering and manufacturing principle, but every principle of clean, competitive selling, and can only result in misunderstandings and sales resistance, as having once departed from a national understanding and enforcement of the manufacturers' rated carrying capacity, there is no limit on overloading that can be accepted as a standard.

Now, therefore, be it resolved, that the National Automobile Chamber of Commerce hereby reaffirms its policy of being unalterably opposed to overloading and overspeeding of motor vehicles and that it condemns the practice of giving certificates authorizing the loading of motor vehicles beyond the manufacturers' published rated carrying capacity, and urges its members to discontinue the granting of such certificates, and be it

Further resolved, that the National Automobile Chamber of Commerce continue to cooperate with the Bureau of Public Roads of the Department of Agriculture, the State Highway Commissioners, and other public road officials, in stamping out the overloading and overspeeding evil for the safety of the public and the protection of motor vehicle transportation over the highways, and be it

Further resolved, that a copy of these resolutions be forwarded to the Bureau of Public Roads of the Department of Agriculture and the National Association of State Highway Officials.

The motor truck committee adopted another resolution suggesting to Highway Commissioner Bennett and Motor Vehicle Commissioner S. Toeckl of Connecticut that they rescind their ruling and adhere strictly to the text of the State law.

Shipments Show 9 Per Cent Gain Over Last November

NEW YORK, Dec. 7—Reports of November shipments of passenger cars and trucks as compiled by the National Automobile Chamber of Commerce show that they exceeded by 9 per cent the total for the same month of last year. It was the first month to show a gain over last year.

Another cause for gratification is the fact that November shipments declined only 21 per cent from the October total, while last year November shipments were 27 per cent less than for October. The shipment figures by months for this year and last follow:

	Carloads		Driveaways		Boat	
	1920	1921	1920	1921	1920	1921
January	25,057	6,485	29,283	3,185	....	93
February	25,505	9,986	43,719	7,507	....	99
March	29,326	16,287	57,273	9,939	....	75
April	17,147	20,187	64,634	14,197	....	1,619
May	21,977	18,608	74,286	15,193	....	2,381
June	22,516	20,269	60,746	18,834	8,350	3,947
July	23,082	19,470	52,342	15,320	8,702	3,725
August	23,386	20,350	34,060	14,290	7,095	3,565
September	20,804	20,150	24,431	13,550	5,469	3,580
October	17,209	17,323	14,127	11,257	2,519	2,300
November	13,253	14,061	9,497	10,509	659	1,385

Optimism Prevails with Tractor Makers

(*Continued from page* 1140)

Gittins was on the program for a paper on "Terms." His position was that during the good selling years a very satisfactory standard of terms had been put into force. His fear was that, now that selling was again highly competitive, terms would be given less consideration.

Bartholomew made an emphatic announcement that his company would continue on a strictly cash basis.

Mount and George M. Gillette were among those who advocated shorter terms. It was decided to appoint a committee to make suggestions in this regard.

The following officers, more of whom were re-elected, were named for the coming year: Chairman, Finley P. Mount; vice-chairman, George M. Gilette; secretary-treasurer, Edwin C. Merwin. The executive committee is composed of George M. Gillette, chairman; E. J. Gittins, J. B. Bartholomew, A. H. Gilbert, Grant B. Willis, C. S. Brantingham, Harry H. Bates and W. R. Snively.

Paige Maps Campaign for Used Car Sales

"Background" Advertisements Will Create Confidence on Part of Public

DETROIT, Dec. 6—Convinced that one of the principal causes for the failure of used car demand has been lack of confidence in the integrity of the dealer offering the car, the Paige-Detroit Motor Car Co. has mapped out a campaign of "background" advertising designed to build up a greater feeling of reliability. The advertising matter will be prepared at the Detroit offices and will be run in papers in any city in which the Paige dealer will assume 50 per cent of the cost.

This advertising will serve only to create confidence. The dealer must run his own ads describing the particular cars which he has to offer. The feature of the "background" ads is the guarantee that all cars are strictly in the condition represented and that money will be refunded if they fail to perform up to the standard set. It formerly was the custom to run three new car ads to one used car insertion. This practice will be reversed for the time necessary to clear stocks of Paige dealers.

Folders have been prepared at the factory illustrating the best arguments for the purchase of used cars. They will be furnished to dealers at the price of printing.

NO DUTY ON TRUCKS

LONDON, Nov. 25 (*By Mail*)—Nyassaland's revised customs tariff puts motor trucks on the free list. It must be proved, however, to the satisfaction of the Collector of Customs that each vehicle has been constructed, adapted and intended to be used solely for the conveyance of goods, while chassis, components and accessories must be so proved to be imported solely for such vehicles.

Competition Slight In Truck Exports

Gordon Lee Tells Sales Managers Foreign Rivalry Is Not Important

DETROIT, Dec. 5—American motor truck manufacturers will be little affected by foreign competition in the export markets of the world for some time to come, said Gordon Lee, director of the automotive division of the Bureau of Foreign and Domestic Commerce, addressing the annual convention of the National Association of Motor Truck Sales Managers, in session here.

Referring to the truck producing companies of England, France, Germany, Italy and Belgium, he showed that even operating at maximum capacity, they could take care of only half the export business done by American manufacturers in 1920. These countries, he said, had recovered the business done by American manufacturers previously, but in the export markets their competition was not important.

Confidential Information Sought

Questionnaires will be mailed to all car and truck manufacturers soon after Jan. 1, asking for detailed confidential figures on exports in 1921, so that these may be turned back into percentages showing just how American motor products found export markets in 1921. General co-operation in the preparation of these, he declared, is necessary in getting a good start toward business in 1922.

Questionnaires will be received monthly from the 850 commercial attachés in all foreign countries outlining prevailing conditions and a constant cable service will be maintained, Lee said, in getting immediate information to manufacturers on prospective business.

To Stimulate Truck Business

Continuance of the movement toward standardization in the automotive field was urged by Lee, the interchangeability of parts being a strong factor in favor of American products. The department is continuing its activity in this respect with the active co-operation of the Society of Automotive Engineers committee, headed by David Beecroft, president of the society.

C. W. Treadwell, manager of sales instruction for the Burroughs Adding Machine Co., demonstrated to the convention the increased success the Burroughs company has found through the sale of its product by sales portfolio rather than demonstration of the machine itself. He said the same method could probably be employed with success in truck sales, the idea being to interest the prospect in the results of transportation rather than the means.

At the executive sessions of the association the business outlook for 1922 was closely studied and plans were considered whereby the association could render assistance in bringing the truck business to the fore. It was agreed that there would be greater stimulation in the truck business than there has been for a year or more and every effort will be made to further it.

Two directors were re-elected, A. C. Burch of Clydesdale and C. J. Helm of Acme, and one new director, Charles Costello of United States was named. Officers for 1922 will be chosen at a directors' meeting to be held this month.

Month Makes Record in Shipment of Cars

(*Continued from page* 1137)

Stabilization of prices, both for the materials which go into motor vehicles and for the finished product, is one of the important problems confronting the industry, and there are increasing indications that costs are adjusting themselves to an era of keen competition. It is the general belief that another month will bring readjustments which will stand for some time.

All eyes are turned toward the New York and Chicago shows which promise the largest number of important announcements made at these expositions in years. An evidence of the public interest in automobiles is found in the large attendance at the New York salon at which only high-priced cars were displayed.

A determined effort will be made at the coming session of Congress to have removed the excise or "stigma" taxes which the new tax bill continued on sales of automotive vehicles and equipment. It is expected also that the Graham joint resolution, which would impose a duty of 90 per cent on American-made surplus war equipment reimported from Europe, will be passed by Congress and cut off this unfair competition.

Allan A. Ryan Purchases Block of Durant Stock

NEW YORK, Dec. 7—Allan A. Ryan, who previously has played an important part in the development of the automotive industry, has taken over a large block of stock of the Durant Motors Co. of Indiana, a subsidiary of Durant Motors, Inc., and will act in a brokerage capacity in handling its sale. This stock will be listed on the curb market and trading in it is expected to be brisk.

Wall Street has been speculating for some time over the possibility of a financial combination between the Durant and Ryan interests, but it can be stated on authority that Ryan simply is acting as a broker for W. C. Durant and his associates. It also can be stated positively that no negotiations are pending for the amalgamation of the Stutz Motor Car Co., with which Ryan has been closely identified, with Durant Motors.

Government Will Buy Few Motor Vehicles

Budget Presented to Congress Makes Provision for Extensive Research

WASHINGTON, Dec. 5 — Estimates submitted to the Congress to-day by the newly created Budget Bureau show that the Government does not contemplate entering the automotive market as a heavy purchaser of motor vehicles during the fiscal year of 1923.

Because of the large quantities of surplus material on hand sentiment in Congress is opposed to purchases of new automotive equipment until it is evident that the surplus has been completely absorbed. However, there is the sign that the Federal authorities expect to spend several millions in research pertaining directly to the automotive trade. There will be live prospects for aircraft and accessories.

Air Service Asks $15,000,000

The estimates of the War Department include $3,038,037 for motor transportation of the Army to be devoted principally to transportation of troops and supplies.

The Army Air Service submitted estimates for $15,000,000, of which $3,000,000 will be devoted to the purchase of new aircraft and equipment. The Army plans to spend $4,200,000 of the appropriation for experimental research in aircraft matters.

It is proposed to use $250,000 in experimental research into helium, and $525,000 for the procurement, installation, improvement of gas plants, hangars, repair shops and ground equipment for the air service.

Navy Given $17,000,000

The estimate of appropriations for the Bureau of Aeronautics of the Navy Department gives the total amount as $17,000,000. It is proposed to use $6,618,100 of this for the maintenance and operation of air stations, fleet activities, aircraft factories, helium plants, testing laboratories, spares, engines and hulls, flying, overhauling and repairing of aircraft and their engines. For new construction and procurement of aircraft and equipment (power plant and hull), $6,631,450 is provided, and for continuing experiments and development work for all types of aircraft, $1,116,950. The sum of $475,000 is asked for construction incident to flying, stowing, releasing or securing aircraft.

Fifteen thousand dollars is asked by the Bureau of Standards for the standardization and testing of mechanical appliances. The Bureau also requests $45,000 for the maintenance and equipping of automotive engines.

The Bureau of Public Roads has renewed its request for an appropriation of $48,000 for investigating engineering problems pertaining to agriculture.

INDUSTRIAL NOTES

General Motors Corp. reports that one out of every four of its stockholders is a woman. In April one out of every five was a woman. There were 17,230 women stockholders of record Oct. 3 as compared with 15,116 on April 15. Women now constitute 21 per cent of all common stockholders and own a total of 6 per cent of the entire issue outstanding. They constitute 45 per cent of the preferred stockholders and own 37 per cent of the outstanding preferred. They represent 41 per cent of the 6 per cent debenture stockholders and own 28 per cent of that stock outstanding. With the 7 per cent debenture, women constitute 21 per cent of the holders of that issue and own 24 per cent of the 7 per cent debenture outstanding.

The White Co. reports that its sales for October were the highest for any month since June, 1920, and that its November business was within about 5 per cent of October. The company has been operating a 44½-hour week for more than a month, as compared with a 32-hour week in July and 40 hours in August, September and most of October. The working force now numbers 2000, which is about one-third of the aggregate employed during the peak period. Inventory, which at the end of 1920 stood at $22,989,000, is now $16,000,000.

Hendee Mfg. Co. is gradually increasing its operations. Manufacturing efficiency is reported to be the highest in the history of the company. In November of this year the company produced 1000 motorcycles and as of Dec. 2, 1921, had orders for 5000 machines. The management is said to be expecting a large business in the spring for both the domestic and foreign account. The company is planning to prosecute vigorously the development of its business in the British Isles.

Savidge Tractor Co. has reorganized as the Savidge Tractor Mfg. Co. with the following officers: President, William Savidge; vice-presidents, C. J. Jacoby and W. M. Edinger; secretary, R. H. Dalby; treasurer, Louis Haefner. These officers together with Frank A. Payton, W. F. Korte, Henry Wehde, Jr., A. J. Schuessler, C. F. Stelzel and John Strubel constitute the board of directors. The new capital is $300,000 preferred and $200,000 common.

Victor Kreft Mfg. Co., formerly of Two Rivers, Wis., has completed its new factory at Eagle River, Wis., and is again in quantity production on shock absorbers and other metal automotive specialties. The concern has contracts on its books with more than a dozen state distributors calling for 2000 sets of shock absorbers for delivery in the next three to five months, as well as large orders for the other articles of its line.

International Harvester Co. Springfield works expects to open this week with nearly a normal force. Production methods are being slightly changed. Production of the light motor truck will soon be brought up to 25 a day, the outlook for business steadily becoming more optimistic. The gray iron foundry has been opened with a force of 75 men.

A. O. Smith Corp., Milwaukee, is engaging in quantity production of a pressed steel running board designed for replacements on cars having the ordinary wooden board, as well as for new designs of cars. The weight of the steel article is no greater than the wooden board.

General Auto Supply Co., Lancaster, Pa., announces the location of its main offices at Harrisburg. The Lancaster and York stores will be continued, but that at Lebanon will be closed after the first of the year.

Firestone Tire & Rubber Co. has purchased the Apsley Rubber Co., manufacturing boots and shoes at Hudson, Mass. Firestone is also considering entrance into other fields of rubber manufacture.

Loening Aeronautical Engineering Corp. is erecting a factory at 420-428 East Thirty-first Street, New York City. It is expected that the new building will be ready for occupancy in the spring.

United States Radiator Corp. of Detroit, a $4,000,000 Michigan corporation, has filed articles and been granted a local charter in Wisconsin. Offices will be established in Milwaukee.

Willys-Overland Co. has received a Pacific coast order for 400 Willys Knights and Overlands this week. A special train will take them from the factory in about a month.

Cleveland Trade Exceeds That of Last November

CLEVELAND, Dec. 6—Business in Cleveland improved greatly in November over the previous 30-day period, according to a survey that has been made by the Cleveland Association of Credit Men.

The improvement shown during November is not the stimulation of Christmas buying to trade, for the annual holiday shopping period is just getting under full swing in this city, as it cannot be said to fairly start until the first of December.

The credit men sent a questionnaire to many merchants in the city, and in the list were automobile retail salesmen. They, with few exceptions, reported that there was a healthy increase in November over the previous month. So far as the 1920 November record is concerned, it has been left far behind.

Sixty-four per cent of the merchants questioned about November business reported that it was better than in October; 18 per cent said it was stationary and 18 per cent said their volume of sales was lower in November.

Chicago Truck Makers Limit Sales District

CHICAGO, Dec. 5—Chicago motor truck manufacturers, with but one or two exceptions, are confining themselves to sales in the local territory. They are not going out of Chicago and immediate territory to keep up their rate of production, and with some this is to be the practice rather than an expediency.

Exceptions are the Available Truck Co., which reports that its sales are greater than for a long time and are scattered over a wider territory through the efforts of its sales force, which has been greatly reduced. Diamond T sales are strong in Chicago, and this company will continue a strong competitor for local business.

Chicago Motor Truck, Inc., is closed down at the present time taking inventory, but will open after the first of the year on scheduled production of one truck a day.

FINANCIAL NOTES

Moline Plow Co. reorganization committee has addressed a circular letter to the holders of the 7 per cent notes extending the time of the deposit to and including Dec. 12. Total claims of all creditors and noteholders, the letter states, computed without interest, approximate $19,500,000, of which $13,650,000 represents claims of bank creditors, $1,840,000 merchandise creditors and $4,000,000 serial noteholders. More than 80 per cent of the serial noteholders have deposited and bank creditors, constituting 70 per cent of the total claims, have accepted the reorganization plan.

Fisher Body Co. for the three months ended Oct. 31 reports a surplus after charges and Federal taxes of $1,939,541, which after allowing for preferred dividends was equal to $3.75 a share on the 500,000 shares of common stock of no par value outstanding. In the previous quarter earnings were equal to $2.30 a share and in the same quarter last year $5.05 a share. The surplus for the six months was equal to $6.06 a share after preferred dividends, as compared with $9.34 a share in the same period last year.

Yellow Cab Mfg. Co., subject to approval of the stockholders, declared a stock dividend of 100 per cent on Class B stock, increasing total outstanding to 100,000 shares, and has increased the cash dividend rate from $7 to $7.20, payable in monthly installments of 60c. each. Stockholders will hold a special meeting this month.

Sharon Pressed Steel Co. final plans for refinancing and taking care of the creditors of the organization have been completed. The statement of the present financial condition of the company shows current assets, $437,452.63; property, plant and equipment, $1,805,786.76; current liabilities, $207,429.11.

Commonwealth Finance Corp. has declared the regular quarterly dividend of $1 a share and an extra dividend of 75c. a share on its common stock and the regular semi-annual dividend of 3½ per cent on its preferred stock, payable to holders of record Dec. 31.

Autosales Corp. declared a dividend of 4 per cent on the preferred stock, payable in preferred stock Dec. 31 to stock of record Dec. 16. In December last year the company declared a dividend in preferred stock amounting to 4½ per cent.

Jordan Motor Car Co. directors, at a meeting this week, declared a quarterly dividend of 1¾ per cent on the preferred stock, payable Dec. 31, to stockholders of record Dec. 10.

American Metal Parts Co., Milwaukee, specializing in automotive parts and equipment, has recently increased its capitalization from $100,000 to $200,000 to accommodate the growth of the business.

Hendee Mfg. Co. has declared quarterly dividends of 1¾ per cent on preferred stock, thus maintaining the rate of previous years.

Torbenson Axle Co. has paid a quarterly dividend of 1¾ per cent on preferred stock.

JENNINGS SPEAKS AT SYRACUSE.

SYRACUSE, N. Y., Dec. 5— Clyde Jennings, managing editor of *Motor Age*, appeared before the students of transportation in the College of Business Administration at Syracuse University in the first of a series of lectures to be delivered by various speakers on the subject of transportation. He surveyed the history of transportation.

MEN OF THE INDUSTRY

C. E. Wilson, chief engineer of the Remy Electric Co., has been appointed factory manager as successor to I. J. Reuter. Reuter has been named general manager of the company to succeed J. D. Mooney, who has become operating vice-president of the General Motors Export Co. F. C. Kroeger, Remy sales engineer in charge of the Detroit territory, succeeds Wilson as chief engineer.

J. H. De Jong, for the past three years associated with the Cole Motor Car Co., has joined the selling division of the Haynes Automobile Co. as Canadian district sales manager, with headquarters in Toronto. Prior to his association with the Cole company, De Jong was a distributor at Omaha for twelve years.

O. Q. Hinds, who has sold his interest in the former Anderson Electric & Equipment Co. of Chicago, has associated himself with B. J. Grigsby, O. E. Grigsby and W. C. Grunow in the Grigsby-Grunow-Hinds Co., a company formed to manufacture automobile accessories.

M. Lincoln Shuster, assistant general manager of the Motor and Accessory Manufacturers' Association, is in Washington this week to take up with the Bureau of Foreign and Domestic Commerce the question of establishing an export department of the M.A.M.A.

Wilson Bailey, who has been acting as eastern district manager for the Trackless Transportation Corp., has been appointed to the position of general sales manager in charge of all sales, both domestic and foreign, for the corporation.

W. C. (Fuzzy) Anderson, former foreign sales executive for the Ford Motor Co., has organized the Anderson Sales Co. of St. Louis to market the new Brevard farm lighting system. Thomas G. May will be secretary of the company.

Federal Corp. Trustee Loring G. Lane has been authorized by the referee in bankruptcy to dispose of the company's property at Westfield, Mass., at public or private sale. The company manufactured spark plugs.

Harry L. Cunningham, Detroit, secretary-treasurer of the Rickenbacker Motor Co. and former Michigan distributor for Maxwell and Studebaker, has been appointed to handle the new Rickenbacker for Michigan.

J. E. Simonds has resigned as export manager of the U. S. Tractor & Machinery Co. He was formerly Chicago manager of the Duplex Engine Governor Co. His future plans are not announced.

John G. Painter, for a number of years sales manager of the Continental Motors Co., has joined the Detroit Pressed Steel Co. as special representative in the Disteel wheel factory sales division.

T. N. Hart, who has been active in the tractor and implement business for several years, has been appointed block manager of the Lima, Ohio, district for the Bates Steel Mule Co. of Ohio.

Alemite Products Co., Ltd., subsidiary of the Bassick Mfg. Co., will begin the manufacture of its products at Belleville, Ont., this month. W. E. Rowsome is general manager.

Gordon Cameron has been appointed director of service for the Republic Truck Sales Corp., in complete charge of the servicing of Republic trucks from the factory.

Edgar Updyke, automobile dealer in Indianapolis, has been named distributor for the Stutz Motor Car Co., covering the Indiana territory.

Jules Berthier has been elected president of the Bergougnan Rubber Corp. to succeed H. H. Coleman, resigned.

E. T. Fuller has taken over the Franklin franchise for the State of Michigan formerly held by W. J. Dougherty.

Walker Evans has been appointed Cleveland representative of MacManus, Inc., advertising agency, Detroit.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

Call money remained unchanged at 4½ to 5½, with a firmer undertone noted, which possibly may have been accounted for by Government withdrawals from local banks and preparations for the interest and dividend disbursements of Dec. 1. There was a slightly easier undertone in time money as evidenced by the 5 per cent rate for all fixed-date maturities from 60 days to 6 months as compared with 5 per cent to 5¼ per cent during the previous week. Prime commercial paper remained unchanged at 5 per cent to 5¼ per cent.

The Federal Reserve statement as of Nov. 30, 1921, showed the total amount of notes in circulation as $2,366,006,000, a decline of $23,910,000 from the previous week, representing the lowest total reported since Sept. 27, 1918.

The total reserves of the New York institution increased $18,302,000, the factors in this being an increase of $21,599,000 in gold reserves and a decrease of $3,297,000 in other cash reserves.

Sterling Rises

The number of commercial failures reported for the month of November was 1988 with total liabilities of $53,469,839. The number of November failures is the largest for any month this year and is 938 more than in the month of November, 1920, when 1050 failures were reported with total liabilities of $30,758,130. The amounts involved in the failures for November, 1921, however, were exceeded in February, March and May of this year.

The average of operations for all steel plants for the month of November was estimated at 40 per cent to 45 per cent against 30 per cent or less at one time last summer. Lake Superior iron ore shipments in 1921 amounted to 22,300,726 gross tons, the smallest amount moved since 1904. Much interest attended the announcement on last Friday that negotiations were under way for the ultimate consolidation of several of the independent steel companies.

Moratorium a Factor

During the past week demand sterling rose to $4.07⅝, a new high record for the year and the highest level since the week ended Nov. 22, 1919, when the rate touched $4.08¾. The discussion of the proposed two-year moratorium for Germany on its reparation payments was perhaps a factor, not only in this rise in sterling, but in the sharp recovery in German marks.

METAL MARKETS

MANY are the hopeful signs that are visible in the present twilight period of the steel market. Of course, what actual buying by automotive consumers is in evidence is strictly of a routine, filling-in character, but the preliminaries to negotiations for 1922 contracts are decidedly encouraging to the steel industry, portending a healthy automotive demand during the first half of the coming year.

Alloy steel specialists report keener interest in automotive steels, although the tonnages involved in inquiries are by no means impressive individually. Much resale alloy steel has, however, been gotten out of the way and the market faces a much improved outlook. About the frailest item in the list of automotive steels is that of cold-finished steel bars. Although the market for this commodity is fairly steady, this is solely due to the incisive retrenchment which has been made in production. The latter continues, even at this advanced date of readjustment in other branches of the steel industry, at not more than one-fifth of the finishing capacity.

Although the sheet market is now heralded to be on the uniform basis of 2.25c. for blue annealed, 3c. for black, and 4c. for galvanized sheets, the price levels recently announced by the Corporation's sheet subsidiary, there continues considerable irregularity. Some of the mills have essayed a dual price for blue annealed, one applying to the heavy gages and another to the lighter gages, from 13 gage and up. Plate mills continue to share the 2.25c. base price freely when inviting tonages of heavier gages are offered.

Pig Iron.—Automotive foundries are not figuring very prominently in the market just now. At best, the pig iron market is marking time.

Steel.—Bessemer screw stock is being quoted at 1.60c., Pittsburgh, on hot-rolled bars, demand being of a routine character. Cleveland alloy steel interests quote automotive steels as follows: Bars, S.A.E. 3100, $4 per 100 lb., base; S.A.E. 2300, $5; S.A.E. 6100, $5; S.A.E. 3200, $5.50; S.A.E. 3300, $7.50; S.A.E. 3400, $6.50; silico-manganese, $3.90; S.A.E. 52100, $9; and chrome-molybdenum steel, $4.75.

Aluminum.—Odd lots of imported aluminum continue to be offered at prices lower than those named as official quotations by the domestic producer. As previously stated, the trade's interpretation of the official prices of the domestic consumer is, however, that they are not necessarily rigid and that on worth while business of the desirable kind foreign competition is being met most energetically.

Copper.—As the result of the recent advances in the copper market the principal makers of copper and brass products issued new price lists on Dec. 1, showing advances ranging from ¼c. to ¾c. per lb. on the different articles they produce. A period of quiet in the copper market is now generally looked for.

EQUIPMENT COMPANY BANKRUPT

KANSAS CITY, Dec. 5—The Zahner-Fowler Equipment Co., with factory and distributing house in this city, has filed a petition in bankruptcy in the Federal Court. Unsecured obligations for machinery, steel and materials, are about $15,000 and notes to banks and creditors a like amount. Assets aggregate $25,000.

Calendar

SHOWS

Jan. 7-13—New York, National Automobile Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 9-14—New York, Motor Car Body Exposition, Automobile Body Builders Association, Twelfth Regiment Armory.

Jan. 28-Feb. 4—Chicago, Automobile Salon, Hotel Drake.

Jan. 28-Feb. 4 — Chicago, National Automobile Show, Coliseum, Auspices of N.A.C.C.

Feb. 6 to 11 — Seventh National Tractor Show and Educational Exposition, Minnesota State Fair Grounds, Minneapolis.

Feb. 6 to 11 — Winnipeg, Can., Automotive Equipment Show, Western Canadian Automotive Association.

FOREIGN SHOWS

Dec. 3-14—Brussels, Belgian International Automobile Show.

March, 1922 — Santiago, Chili, Annual Automobile Show.

May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

Sept. 1922 — Rio de Janeiro, Brazil, Automobile exhibits in connection with the Brazilian Centenary Associcao Automobilista Brazileria.

CONVENTIONS

Dec. 10—New York, American Institute of Mining and Metallurgical Engineers.

Dec. 20—Philadelphia, American Society of Mechanical Engineers.

Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.

Jan. 17-20, 1922—Chicago, American Road Builders Association.

Jan. 30-31—Chicago, Fifth Annual Convention, N. A. D. A., La Salle Hotel.

Jan. 30-Feb. 2—Boston, Sixth Annual Conference of the International Delivery Association, Copley Plaza Hotel.

June 11-15—Milwaukee, Annual International Convention of the Associated Advertising Clubs of the World.

Sept. 18-23, 1922—Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.

S. A. E. MEETINGS

Detroit, Dec. 23, Feb. 24, Mar 24, April 28, May 26.

New York, Jan. 10-13, 1922—Annual Meeting.

Chicago, Feb. 1

Minneapolis, Feb. 8-9—Annual Tractor Meeting.

Reeves Discusses Taxes with Mellon

Also Confers With Government Officials on Credits and Standardization

WASHINGTON, Dec. 5—The outstanding developments of conferences between Alfred Reeves, general manager of the National Automobile Chamber of Commerce and Government officials here last week, was the statement that credit prospects for the automobile industry were distinctly favorable and that standardization activities were progressing without detracting from the individuality of distinctive automobile types.

Credit Situation Encouraging

Reeves discussed the tax situation as it affects the automobile industry in detail with Secretary of Treasury Mellon. It is expected that this conference will have much to do with the recommendations of this cabinet officer in the future, possibly at the next session of Congress, when an effort will be made to amend the latest tax bill and remove burdensome excise taxes from the automotive industry.

Governor Harding of the Federal Reserve Board gave Reeves an encouraging view of the general credit situation as it affected the industry. It is expected that money will be available at lower rates during the winter.

Working on Standardization

At the Department of Commerce, the automobile representative discussed standardization activities of the Bureau of Standards. He was told that the principal effort was directed toward the elimination of waste, and as a consequence brought about lower production cost. For instance, he was told of efforts to reduce the 10 or 12 sizes of steering wheels to four, which could be accepted as standard for the automotive industry. So far as Reeves could ascertain, there is nothing in the plan of the Department of Commerce to take individuality from car designs, but instead they are conducting a great work to save money for manufacturers and incidentally increase sales through lower prices.

Conferences also were held with officials in the automotive division, Bureau of Foreign and Domestic Commerce, and plans were discussed for co-operation of the Government with the industry in the promotion of domestic trade as well as foreign business.

Reeves talked with Senate and House leaders regarding the tax situation and other important problems of the trade.

Lower Distribution Costs Sought by Tire Industry

AKRON, Dec. 6—The tire industry has turned to selling costs as the next problem to be solved in bringing the industry to rock-bottom basis. Much has already been done in the way of closing expensive branches in the high-rent districts in large cities, but the cost of distributing the products remains as high as 30 per cent in some instances.

Sales departments were the first to feel the new policies brought about by the depression, but changes in policies consisted mainly in weeding out all salesmen except those who were actually producing profits.

This, however, has been found to be insufficient and further plans are being considered to curtail sales costs. The methods to be used are purely a matter of speculation. The factories are on the most efficient basis of their history. Every semblance of extravagance has been eradicated.

MANY OLD TIMERS ACCEPT

NEW YORK, Dec. 5—The first annual New York dinner of the Old Timers' Club, already announced for Monday evening, Jan. 9, at the "S. S. Flotilla," will be one of the most largely patronized events of automobile show week, according to the committee in charge, which reports heavy early reservations from all parts of the country. The attendance will be automatically limited to 400, the maximum capacity of the "S. S. Flotilla."

Japan Not Seeking Texas Helium Fields

United States Navy Department Denies That Negotiations Have Been Opened

WASHINGTON, Dec. 5—Recommendations have been made by Dr. Joseph S. Ames, chairman of the National Advisory Committee for Aeronautics, for the acquisition by the Government of the best helium producing fields and for the promotion of research into the uses of helium. There has been a rumor current that emissaries of the Japanese Government had made overtures to the Navy Department for the purchase of helium properties in Texas but the Navy officially denies such negotiations.

The helium fields in Texas are under the joint control of the Army and Navy. According to Dr. Ames, it is necessary for national defense to acquire and seal these properties for future use and prevent their exploitation by commercial interests.

Helium, a non-inflammable gas, is expected to revolutionize aircraft product especially as it relates to dirigibles. A demonstration before scientists here today showed that helium is superior to hydrogen with the exception that the lifting power is eight per cent below that of hydrogen.

Export Managers to Meet During New York Show

NEW YORK, Dec. 7—Export managers of the National Automobile Chamber of Commerce will meet here in their annual convention on Jan. 10, during the annual show. Decision to hold this meeting was made to-day by the N. A. C. C. directors.

The proposed program will take up the subject of distribution in foreign countries, road building, financial credits for the automotive industry from the War Finance Corporation, and the possibilities of combination of American firms for developing export trade.